BICYCLE MANUFACTURING ERP SYSTEM

RISK MANAGEMENT PLAN

Version *4.0*
07/04/2021

VERSION HISTORY

Version #	Implemented By	Revision Date	Approved By	Approval Date	Reason
1.0	*Michael, Armando, Kelvin*	*01/26/21*	*Daniel, Celia, Piravien, Michael*	*02/02/2021*	Initial Risk Management Plan Sprint 1
2.0	*Michael, Armando, Kelvin*	*03/02/21*	*Daniel, Celia, Piravien, Michael*	*24/02/2021*	*Development Risk Management Plan Sprint 2*
3.0	*Michael, Armando, Kelvin*	*25/02/21*	*Daniel, Celia, Piravien, Michael*	*17/03/2021*	*Development Risk Management Plan Sprint 3*
4.0	*Michael, Armando, Kelvin*	*18/03/21*	*Daniel, Celia, Piravien, Michael*	*06/04/2021*	*Development Risk Management Plan Sprint 4*

UP Template Version: 11/30/06

TABLE OF CONTENTS

1   INTRODUCTION

1.1   PURPOSE OF THE RISK MANAGEMENT PLAN

The Risk Management Plan is a crucial document towards the successful completion of the Bicycle Manufacturing ERP System. Generally a risk is an event that can be identified as having a negative effect on the development of the project if it occurs. The risk management plan allows the development team to identify potential issues before they occur. Risk-handling activities can be applied at any point during the lifecycle of the product to reduce the potential impact on the completion of the objectives/project. While the Risk Management Plan is heavily emphasized during the early stages of the project, this document must always be considered and reassessed throughout the project's development. The intended audience of this document is the project team, stakeholders, and management. The focus of this document is to handle the risks involved with the software development process.

2   RISK MANAGEMENT PROCEDURE

2.1   PROCESS

While new risks will arise throughout the development of this system, risks will be identified and addressed as early as possible. Early identification will aid in avoiding severe consequences as proper measures will be taken to actively stay away from likely events of high impact. This includes examination of each element of the project structure to find risks, risk assessment by using risk taxonomy (comprehensive set, common set and stable of risk categories), reviewing risk management efforts from similar products, researching documents and databases, examination of design specification and requirements and qualitative and quantitative analysis [1]. The following subsections will outline the steps to identify, analyze, respond, and monitor risks throughout the development of this project. Michael Lee is designated as the Risk Manager for this ERP system.

2.2   RISK IDENTIFICATION

Risk identification is the initial step to managing and mitigating risks. In this case, it is the act of observing and attempting to identify potential problems that could be encountered both short and long term. The degree of risk is quite extensive, encapsulating various different factors such as environment, organization, management, development, and operations. Those directly responsible for the identification process are the developers of the software as well as the stakeholders involved, such that many different aspects could be accounted for.

2.3   RISK ANALYSIS

Risks vary to different degrees. Once identifying the events with risk, it is important to analyze their potential effect on the schedule, development, and/or budget of the system. As such, some risks should be monitored more closely than others. While risk analysis can be subjective, the following guidelines should be followed closely to aid in avoiding inconsistencies.

2.3.1   Risk Analysis Guidelines

Risk can be measured qualitatively using a Risk Assessment Matrix. The Risk Manager is able to determine the risk by categorizing each risk's level of Impact and level of Probability of Occurrence, on a scale of 1 to 5 (see figure 1.1 and figure 1.2 for more information). These levels are reviewed with input from the project team, along with guidance from stakeholders. Using the Risk Assessment Matrix below, it is possible to associate the appropriate level of risk as follows:

- Green → Low Risk (1-6)
- Yellow → Moderate Risk (8-12)
- Red → High Risk (15-25)

Impact	I5 (>4%)	5	10	15	20	25
	I4 (<4%)	4	8	12	16	20
	I3 (<3%)	3	6	9	12	15
	I2 (<2%)	2	4	6	8	10
	I1 (<1%)	1	2	3	4	5
		P1 (~10%)	P2 (~30%)	P3 (~50%)	P4 (~70%)	P5 (~90%)
	Probability of Occurrence					

Figure 1.1: Risk Assessment Matrix

It is up to the Risk Manager's discretion as to how to associate the appropriate probability and impact levels. Tables 1.2 and 1.3 describe the 5 levels of probability and impact, respectively.

Level	Description	Probability of Occurrence
P5	Extremely likely to occur	~90%
P4	Highly likely to occur	~70%
P3	Likely to occur	~50%
P2	Less Likely to occur	~30%
P1	Not likely to occur	~10%

Figure 1.2: Levels of Probability of Occurrence

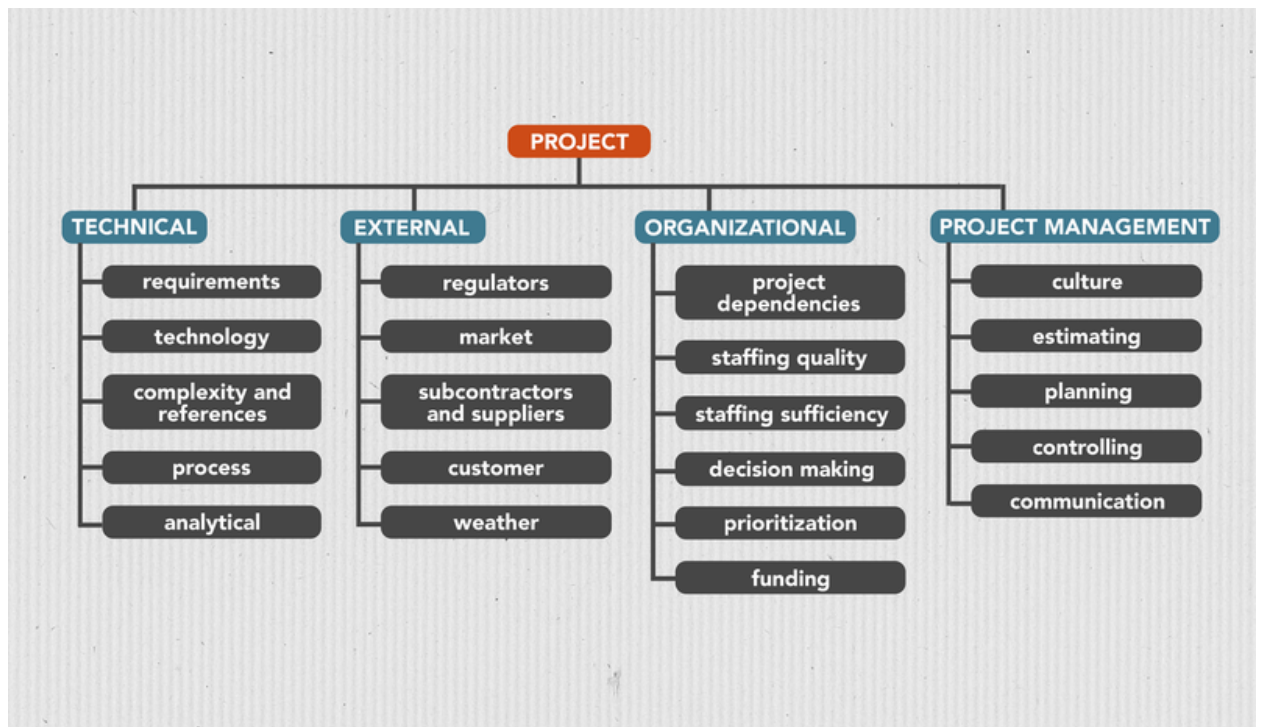| Level	Description	Impact
I5	Extremely significant negative impact on the organization, delaying timelines and going over-budget.	>4%
I4	Significant impact on the organization	<4%
I3	Moderate impact on the organization	<3%
I2	Minor impact on the organization	<2%
I1	Minimal impact on organization	<1%

Figure 1.3: Levels of Impact

Figure 1.4: Project Risk Categories [2]

2.3.2 Analyzing Project Risks

Using the guidelines defined in section 2.3.1, a list of software development risks can be organized by their risk level; notably low, moderate, or high risk. This list should be monitored by the Risk Manager at least once a week, adding new risks that may arise throughout the development process.

Risk Description	Probability	Impact	Cost Impact	Expected Monetary Value (P * Cost)	Risk Score (P * I)	Risk Level
Incomplete Requirements	P5	I5	TBA	TBA	5*5= 25	High
Over Budget	P3	I5	TBA	TBA	3*5= 15	High
Exceed Delivery Date	P3	I5	TBA	TBA	3*5= 15	High
Change in Requirements	P3	I5	TBA	TBA	3*5= 15	High

Low Productivity	P3	I4	TBA	TBA	3*4= 12	Moderate
Lack of Leadership /Direction	P2	I4	TBA	TBA	2*4= 8	Moderate
Project Member falls ill	P3	I3	TBA	TBA	3*3= 9	Moderate
Freeloader	P1	I5	TBA	TBA	1*5=5	Low
Layoffs	P1	I5	TBA	TBA	1*5=5	Low
Personality clash	P2	I3	TBA	TBA	1*6=6	Low
Lack of organization	P1	I4	TBA	TBA	1*4=4	Low
Over Reliance on meetings	P3	I2	TBA	TBA	3*2=6	Low
Lack of communication	P2	I3	TBA	TBA	2*3=6	Low
Team miscommunication	P2	I3	TBA	TBA	2*3=6	Low
Teammate is late to meeting	P4	I1	TBA	TBA	1*4 = 4	Low

Figure 1.5: Quantitative Risks

2.4   RISK RESPONSE PLANNING

It is crucial that risks that are categorized as high risk (red) are addressed accordingly. Proper actions must be taken to try and avoid the occurrence of these events throughout the development of this system. Each risk has a different response. Due to ever-changing circumstances, the ideal risk response is given first, followed by the next best choice, and so on.

We have defined three kinds of risk response:

- **Acceptance:**
  Nothing should or could be done to avoid the risk. For low risk, either the probability and/or impact is low enough that the overall effect of this event occurring is minimal. Applying resources for low risk events may not be worth the time and effort as it may be unlikely to happen or its impact is small. For high risk events, acceptance should only be applied if there is nothing else that can be done.
- **Mitigation:**
  Actively applying measures to reduce the probability or impact of the risk. This response should only be applied if the risk cannot be avoided completely.
- **Avoidance:**
  Remove the possibility of the risk occurring by taking out the cause. This response should be applied if possible.

For example, ideally the development team should be given enough time to complete their work and have some slack if productivity dips, therefore avoidance of tight scheduling would be the ideal risk response. However, a contract-binding agreement with the customer may not allow for this response, therefore a mitigation plan would be put into place to reduce the severity of this risk if it occurs.

Risk Description	Risk Generated	Risk Response	Mitigation, remedie	Risk level
Employee Turnover; someone is sick, someone quits, layoffs, vacations	Delay in development	Avoid → mitigate→ accept	Plan for key project figures to have a well-informed secondary who can take charge when and if necessary	High
Tight/Unrealistic Scheduling; not enough time attributed to certain tasks	Delay in development	Avoid → mitigate	Allocating more resources to tasks during the development to maintain efficiency and prevent delay.	High
Changes in	Insufficient	Mitigate →	Including a safety margin	High

budget; unforeseen events and unprecedented times could affect financials	Funds, Overrun	Accept	for every activity during the planning phase.	High
Incorrect frameworks and technology; technology must be changed to support future needs.	Delay in development	Avoid → Mitigate	Ensure that the technology decisions that are chosen along the way allow for future growth and can meet the product's end goals. Furthermore, the technology should account for future features and needs.	High
Insufficient growth management, not having the appropriate resources to sustain future growth	Delayed growth and lack of user support and satisfaction	Avoid → Mitigate	Include additional resources to support a growing service while still providing the best quality to all users	High
New requirements; as production advances, new features may be needed that were left out	Delay in development	Avoid → Mitigate	Brainstorm as a group. Once a week, workers should have a discussion period where they speak of future needs that may be necessary as they work	High
Inadequate project planning; unorganized team and lack of documentation and meetings	Delay in development, Project failure, Overruns	Avoid → Mitigate	Frequent communication among teams, and frequent meetings and discussions to discuss progress	High

Insufficient Testing; features aren't working effectively while being approved and added to the overall project	Software flaws, information leaks, delay in development, project failure	Avoid → Mitigate	Thorough testing must be enforced for an extensive variety of possible cases. Testing must be frequent to prevent later discovered faults	High
Lack of user support; not enough available help to users	Decrease in customer satisfaction, project failure	Avoid → Mitigate	Simple interface with strong user support including guides to help as well as instructions to aid utilizing the service. Online help services such as email response, FAQ, tutorials	High
Lack of 3rd party support; a company whom we are dependent on breaks contract/might not renew/changes terms	Delay in development, project failure	Avoid → Mitigate	3rd party companies whom we are reliant must communicate regularly with details and information regarding project status	High
Lack of organization amongst team, lack of effective organization that enhance the team's performance	Delay in development Missing key components in development process Possible duplicate work	Avoid → mitigate	Ensure tasks are distributed amongst the group Create a document that keeps track of what is being worked on and by which individual	High

Insufficient Communication, lack of effective communication that enhance the team's performance	Delay in development Possible duplicate work	Avoid → mitigate	Allow for frequent communication between small groups, which in turn communicate with other groups	High
Lack of Understanding among customer and team, gaps of understanding between both parties impair development	Delay in development Unmet requirements	Avoid → mitigate	Ensure ideas are properly understood by both parties Repeat things to confirm an understanding Take notes of details	High
Low attention to details, crucial components are missed and left out	Delay in development	Avoid → mitigate	Ensure all parties were attentive by speaking amongst each other about it	High
Projects interfering, other projects that various teams are associated to affect development	Delay in development	Avoid → mitigate	Better time management Ensure proper scheduling with large time frames to allow for delay	High
Lack of understanding among team, gaps of understanding between team impairs development	Delay in development	Avoid → mitigate	Ensure time in meeting suffices for discussion as well as the asking and answering of questions.	High

Misunderstanding of given specifications	Delay in development Unmet requirements	Avoid → mitigate	Review requirements frequently with team to form a better understanding.	High
Creating of various different problems when working on different platforms; a varierty of bugs are introduced	Delay in development	Avoid → mitigate	Compile a document that has common errors that have been experienced along with their solutions.	High

Figure 1.6: Risk Response Planning

2.5   RISK MONITORING, CONTROLLING, AND REPORTING

The level of risk in this project will be tracked, monitored and reported throughout the project lifecycle. The following risks are the "Top 10 Risk List" that will be maintained, analyzed and updated. Management will be notified of important changes to the risk status by following the guideline below.

1. The risk is identified
2. The risk is assessed. We may want to have different statuses for qualitative and quantitative assessments.
3. The risk is controlled. We may want to identify all the control actions taken: avoidance, mitigation, transfer, acceptance
4. The risk is triggered. From that point, you are in contingency mode. Once resolved, the risk goes back to control.
6. The risk is closed. Some risks are never closed, for example, hazards.

Risk Description	Category	Risk Level	Risk Status	Accountable
Incomplete Requirements	Requirements	High	Identified → Assessed	Michael
Over Budget	Estimation	High	Identified → Assessed	Kelvin
Exceed Delivery Date	Estimation	High	Identified → Assessed	Armando
Change in Requirements	Requirements	High	Identified → Assessed	Kelvin
Misunderstanding between customer and team	People	High	Identified → Assessed	Armando
Project Interference	Organizational	High	Identified → Assessed	Kelvin
Misunderstanding between team members	People	High	Identified → Assessed	Michael
Misunderstanding of specifications	People	High	Identified → Assessed	Armando
Variety of Experienced Bugs	Software	High	Identified → Assessed	Armando

Low Productivity	People	Moderate	Identified → Assessed	Michael
Lack of Leadership /Direction	Organizational	Moderate	Identified → Assessed	Michael
Project Member falls ill	People	Moderate	Identified → Assessed	Kelvin
Low Communication	People	Moderate	Identified → Assessed	Michael
Low Organization	Organizational	Moderate	Identified → Assessed	Armando
Layoffs	Organizational	Low	Identified → Assessed	Armando
Teammate is late to meeting	People	Low	Identified → Assessed	Michael

Figure 1.7: Top Risk List

3 TOOLS AND PRACTICES

The risk log will be maintained by the project manager. Furthermore, it will be reviewed at least twice a week in order to decrease the probability of running into risks as much as possible. Lastly, with the use of a frequent analysis of the log and discussions in the meetings, we can detect problems earlier on in development where the negative impact isn't as bad as if it were found later on in the project. Refer to document [3] for the tools and practices.

RISK MANAGEMENT PLAN APPROVAL

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

Signature: _____N/A_____ Date: ___02/02/2021___

Print Name: ___Daniel Gauvin___

Title: ___Scrum Master___

Role: ___Reviewer___

Signature: _____N/A_____ Date: ___02/02/2021___

Print Name: ___Celia Cai___

Title: ___Project Manager___

Role: ___Reviewer___

Signature: _____N/A_____ Date: ___02/02/2021___

Print Name: ___Piravien Suntharalingam___

Title: ___Chief Technology Officer___

Role: ___Reviewer___

Signature: _____N/A_____ Date: ___02/02/2021___

Print Name: ___Michael Lee___

Title: ___Risk Manager___

Role: ___Writer & Reviewer___

APPENDIX A: REFERENCES

The following table summarizes the documents referenced in this document.

Document Name and Version	Description	Location
Guide to risk taxonomy	Risk Management Taxonomy	[1]-https://www.canada.ca/en/treasury-board-secretariat/corporate/risk-management/taxonomies.html
Risk breakdown structure	Risk Structure Breakdown	[2]-https://www.fool.com/the-blueprint/risk-breakdown-structure/
The best management tools and techniques	Risk Management Tools and Techniques	[3]-https://www.projectmanager.com/blog/risk-management-tools-techniques

APPENDIX B: KEY TERMS

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

Term	Definition
ERP	Enterprise Resource Planning.
Mitigation	Reduction of the negative impact of a risk.
UP	Unified Process.