Original Research Article

Risk Management in ERP Deployment for a Dairy Company

Rong Pei

The Australian National University, Acton, Canberra, 2601, ACT

Abstract: This article explores the development and implementation of a structured risk management framework for Norco's proposed ERP system. By systematically identifying and analyzing potential risks, the report demonstrates how Norco can allocate resources efficiently and develop targeted mitigation strategies to address key challenges. Through a proactive approach to risk management, the article shows how Norco can successfully navigate ERP implementation risks, ensuring project success and achieving sustainable organizational growth.

Keywords: Risk Management, ERP Implementation, Contingency plans, Mitigation Strategies

1. Introduction

Founded in 1894 in New South Wales, Norco is a 100% Australian farmer-owned dairy cooperative supplying retailers like Coles and Aldi with dairy products such as milk, cream, and butter. With over 120 years of history, Norco values Authenticity, Connectivity, Diversity, and Agility^[1]. These principles emphasize integrity, community respect, and adaptability to changing markets.

In order to achieve sustainable operations, implementing an Enterprise Resource Planning (ERP) system has become crucial for Norco. This initiative addresses three main challenges: 1) competitive pressure from the dairy market^[2], 2) declining returns for farmers^[3], and 3) government support for digitization in the dairy industry ^[4]. By implementing an ERP system, Norco aims to enhance competitiveness, increase member revenue, and ensure long-term sustainability. This article discusses the potential risk management strategies during the implementation of the ERP system for Norco.

2. Project Output

The purpose of Norco's ERP system implementation is to improve efficiency, be more competitive, generate more revenue for members, and make members happy. Figure 1 outlines the tangible artifacts and components from project implementation, as well as the target outcomes that the ERP system aims to achieve.

Characteristic	Output	Target outcome
	-	-
Streamline	Integrated systems include different modules	Simplifies unnecessary intermediate processes and
processes	that focus on the specific business process.	improves work efficiency.
Manage inventory	The inventory management module.	Inventory quantities can be tracked in a timely manner
Member engagement	Member feedback platform and communication channel.	Improve relationships with members and actively engage them in operations and management.
Supply chain trackability	Supply chain management module	Milk is gathered from different sources promptly. The quality of milk provided by members can be tracked for further improvement.
Manage orders	Order management module	Efficient order management and real-time pricing which boosts member revenue.

Figure 1	l. Output ar	d Target	Outcomes	for	Nor5	co's	ERF
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3. Objectives of the project risk management process

3.1. Objectives of project risk management

The objective of project risk management is to control the risks in the ERP system project process, i.e., to identify, measure, monitor, and address potential risks in the project process^[5]. For Norco's ERP implementation project, the goals of risk management can be more specific:

1. The risk management process can play an important role in identifying ERP implementation risks for Norco. By recognizing implementation risks, Norco has the opportunity to prioritize risks and allocate resources to address them in a more effective way, making the project more likely to succeed.

2. Ensuring data integrity and security is another risk management process objective. Ensuring data security and privacy can be an important task for the project team, as a data breach could be disastrous for the entire company.

4. Project Risk Management Plans

4.1. Root cause analysis for Norco's ERP system

For Norco, it is important to conduct a root cause analysis before identifying a risk, as this allows for the discovery of potential factors that could lead to the risk and a better understanding of why the risk may have occurred^[6].

4.1.1. root cause analysis for scope creep for Norco

Scope creep is when the scope of a Norco ERP project exceeds its originally intended boundaries. This can occur due to frequent changes in project management.

Why 1: why there are frequent changes in project management?
Because the project requirement is unclear and need modify all the time.
Why 2: why the project requirement is unclear and need modify all the time?
Because shareholders always change their minds and provide incomplete information.
Why3: why shareholders always change their minds and provide incomplete information?
Because shareholders receive insights from market trends and are unfamiliar with information technology.
Why 4: why shareholders receive insights from market trends and are unfamiliar with information technology?
Because market trend have a large impact on the success of Norco' revenue.
Why 5: why market trend have a large impact on the success of Norco's revenue?
Because customer preferences and demands change over time.

(Figure 2. Five Whys Analysis for Scope Creep in Norco's ERP Implementation)

4.1.2 root cause analysis for limited resources for Norco

Norco is likely to face problems due to limited resources for the implementation of the ERP project. The main reason for this may be budget constraints.

Why 1: Why there is always a budget constraint for the ERP implementation project? Because the actual project expenses are always larger than the estimated budget. Why2: why the actual project expenses are always larger than the estimated budget? Because there are always many uncertainties existing during the implementation. Why3: why there are always many uncertainties existing during the implementation? Because there are many factors that will contribute to change during the project. Why4: why there are many factors that will contribute to change during the project? Because this project have large impact on Norco's shareholders and different departments. Why 5: why this project have large impact on Norco's shareholders and different departments? Because the ERP system will transform how Norco operates.

Figure 3. Five Whys Analysis for Limited Resources in Norco's ERP Implementation

4.1.3 root cause analysis for Integration difficulties for Norco

The fishbone diagram also helps to provide a fundamental analysis of Norco's implementation project. The figure shows a fishbone diagram of the integration difficulties of Norco's ERP project.



Figure 4. Fishbone Diagram for Integration Difficulties in Norco's ERP Implementation

4.1.4 Root cause analysis for misalignment with business process for Norco

Another problem with the Norco ERP implementation project may stem from a lack of alignment with business processes. The figure shows a fishbone diagram of the integration difficulties of the Norco ERP project.



Figure 5. Fishbone Diagram for Misalignment with Business Processes in Norco's ERP Implementation

4.2 project risk identification

Subsequently, a project risk identification has been developed based on Norco's root cause analysis to identify and document uncertainties that may have an impact on the project. Figure 6 shows the risk identification table for the Norco ERP implementation project.

D	Risk title	Risk description	Risk owner	Trigger
R1	Scope Creep	The project scope gradually expands beyond its original boundaries.	Project owner	Shareholders may introduce new requirements.
R2	Limited resources	Project team are not able to access to the necessary resources.	Project manager	The supplier does not deliver materials and services as scheduled.
R3	Integration difficulties	Project team are not able to integrate new ERP system with Norco's other system.	Project manger	Project team need to integrate ERP system with a number of existing systems of Norco.
R4	Misalignment with business process	The ERP process have problems matching with Norco's daily operations.	Project owner	Project team may not collect sufficient users' requirements.

Figure 6. Risk Identification Table for Norco's ERP Implementation

4.2.1. project risk analysis and risk plans

In order to manage risks in an efficient and cost-effective manner, Norco must conduct a risk analysis after identifying risks and develop strategies to mitigate or avoid identified risks that could negatively impact the success of the project^[7]. Figure 7 shows the project risk analysis. At the same time, the probabilistic impact matrix helps to categories and prioritize risks, as shown in Figure 8. Figure 9 shows the risk plan for the Norco ERP project.

Risk title	Probability of	Magnitude of Impact	Risk category
	occurrence		
Scope creep	Medium	High, the expanding scopes may bring more costs as well as the delays of projects.	High, the potential negative impact is large and need active management and mitigation plan.
Limited Resources	High	High, the project may be delayed, and the quality of project may be negatively impacted due to resources constraints.	High, it would have a negative impact on the success of the project and need active management and mitigation plan.
Integration difficulties	High	High, the system may not work, and business process will be disrupted.	Extreme, it would have a server impact on the success of the project and need to pay more attention as well as have active management and mitigation plan.
Misalignment with business process	Low	High, the misalignment may decrease the productivity of Norco, thus reducing their revenue.	Moderate, it would have a negative impact on the success of the project and need mitigation plan.

Figure 7. Risk Analysis for Norco's ERP implementation

	Probability					
		Rare	Unlikely	Possible	Likely	Almost Certain
Severity	Insignificant					
	Hinor					
	Moderate					
	Major			R1	R2	
	Catastrophic		R4		R3	



Figure 8. Probabilistic Impact Matrix for Norco's ERP Risks

Risk title	Contingency plan	Risk response	Action owner
Scope areep	Establish change control process to make sure all scope changed will be documented and evaluated. Allocate additional resources for incidences.	Actively communicate with shareholders to gain their understanding and alignment.	Project manager
Limited Resources	Develop a resource allocation strategy and prioritize all tasks to make sure that important task could access to resources first when there are limited resources.	Identify potential resource shortages during the resource planning stage.	Project manager
Integration difficulties	Ensure the project tram includes technical experts and professions who have experiences dealing with technical difficulties.	The project team need to choose the ERP solution which is suitable for Norco and have strong integration capability.	Project manger
Misalignment with business process	Make emergency configuration changes to make sure the ERP system is aligned with Norco's business process.	The project team need to spend time communicating with the members and employees of Norco to better gather requirements.	Project manager and shareholder representative

Figure 9. Risk Mitigation Plan for Norco's ERP Implementation

4.3 Project risk management strategies

4.3.1 management strategies

Project risk management strategies allow for a systematic and structured approach to risk management, providing solutions to counter the negative impacts of uncertainty ^[8], thus giving Norco the opportunity to operate smoothly. Figure 10 shows the risk response strategies associated with Norco's identified risks.

Identified risk	Strategy	Description	Related responses		
R1: Scope Creep	pe Creep Avoid Due to the complexity of ERP projects, the changes in scopes could significantly impact the schedules, budges, and the overall success of Norco's ERP project, thus it is important to for the project team to adhere on the original plans to ensure the project is completed on time and within budget. See Transfer The transferring the risk of scope creep allows Norco to have a more predictable financial outcome, thus giving the company an opportunity to pay more attention to other critical project areas. See		Set a clear objective and collect detailed requirements from shareholders as much as possible. Ensure all shareholders of Norco share a unified vision of the objective for establishing the ERP system.		
			Set a fixed-price contracts with a third party for the ERP project to ensure the price will not be impacted no matter what unexpected things happen. Buy a premium insurance to protect against unexpected costs from potential risks.		
Mitigate It is impossible and unrealistic to avoid or transfer scope creep risks for Norco and E mitigate strategy could control and deal with these unavoidable changes, thus reducing uncontrollable costs as well as ensure the flexibility of Norco's ERP project.		It is impossible and unrealistic to avoid or transfer scope creep risks for Norco and mitigate strategy could control and deal with these unavoidable changes, thus reducing uncontrollable costs as well as ensure the flexibility of Norco's ERP project.	Establish change management protocol to systematically address any proposed changes to the ERP project, thus ensuring these changes are necessary.		
Accept This will not actively prevent scope creep and only prepares to address it once it Co happens, which means actions only being taken after scope changes have been identified.		This will not actively prevent scope creep and only prepares to address it once it happens, which means actions only being taken after scope changes have been identified.	Continuous monitoring thorough the progress of Norco's ERP project, which allow the project team to detect changes from the early stages, thus making them well prepared.		
R2: limited Resource	Avoid	The aim is trying to eliminate the possibility of project disruptions or termination due to the insufficient budget and resources of Norco's ERP project.	Detailed resource planning, which requires Norco's ERP project team to understand detailed and precise resources needed at each stage, thus avoiding the unplanned shortages. Review resources periodically, and this allows the project team to monitor the usage of resources, thus ensuring the resourced are sufficient and used efficiently.		
Transfer Norco could pass the limited resources to a third p management and handle the financial uncertainties ERP project.		Norco could pass the limited resources to a third party to have a better financial management and handle the financial uncertainties and complexities brought by the ERP project.	Enter an agreement with ERP suppliers, thus the supplier could provide the software or hardware that Norco needs as quickly as possible.		
	Mitigate	Norco has more possible chances to adjust and adopt to the uncertainties, thus bringing more flexibility to the project team.	Resource leveling(Simon, et al., 2017), and this requires the project team to use a different available resource if a certain resource is being used heavily.		
	Accept	Norco could make adjustments based on the actual resource consumption and needs	Priorities the most critical tasks of Norco's ERP system, ensuring the most important tasks of Norco's ERP system are developed first, thus reducing negative impact the success rate of the project.		

R3: integration difficulties	Avoid Transfer	This aims to prevent the integration issues from the start and try to prevent the potential problem from encountering the integration risks. Norco could transfer the responsibility and potential financial	Choose a compatible ERP system, which enables different software and technologies work together effectively, thus making the integration smoother and more efficient. Utilize middleware solution, which could act as a bridge
		party.	integration qualities between different systems.
	Mitigate	It is possible that unexpected integration challenges may rise during the implementation process, which means Norco needs to prepare for these integration challenges, thus reducing the negative impact to the project.	Have a backup system, which could be a duplicate of the original system, thus ensuring there's no disruption for Norco's daily operations.
	Accept	It is likely that unforeseen integration issue may rise, and Norco need to prepare for these challenges, thus reducing the negative impacts brought by these challenges.	Develop a contingency plan, which is about how to address these potential integration problems when they occur, thus reducing the downtime and ensuring smoother operation of Norco's business.
R4: misalignment with business process	Avoid	This aims to avoid misalignment with business process from the very beginning, since addressing misalignment issues can be time-consuming and expensive.	Conduct business process mapping, which could create a clear picture between the business process and relevant functioned required for the ERP system.
	Transfer	Since addressing misalignment issues could be expensive, transferring responsibilities to the third party could reduce the negative financial impact.	Have a service level agreement with a third party ERP vendors, and if it is not aligned, the vendors may be liable for refunds or penalties.
	Mitigate	It attempts to adjust misalignment issue after the ERP system is implemented (Wei et al.,2005) and focusing more about managing and adjust risks.	Gather continuous feedback from end-users, which could make sure their needs are addressed.
	Accept	It tries to solve the issues where a certain feature of the ERP is not perfectly aligned with the business process of Norco.	Provide training to the employees, which allows them to know the differences between the legacy system and new system, thus bridging the knowledge gap.

Figure 10. Risk Management Strategies for Norco's ERP Implementation

A contingency plan will provide more specific actions that need to be taken when a predetermined condition occurs than a project risk response^[9], which can provide detailed and clear instructions for Norco's ERP project team. Figure 11 shows the contingency plan associated with Norco's ERP implementation project.

		1	
Identified risk	Triggers	Contingency plans	Action owners
R1: Scope Creep	(if) shareholders are not available to provide detailed requirements (e.g., on vacation)	Predetermine a list and prioritize the shareholders to ensure which are most important and attempts to collect their feedback first.	Project manager, as they need to ensure that shareholder communication occur as planned.
	(If) shareholders display uncertainty about their needs and change their requirements all the time.	The project team needs to renegotiate terms in the fixed-price contract with the third party.	Project manager, as they need to ensure the project to stay within scope and budget.
R2: limited Resource	(if) the utilization of a particular resource surpasses a predetermined threshold.	The project team needs to use other available resources to complete the task.	Project manager or resource manager, who have responsibility to ensure the project to stay within scope and budget.
	(if) the expense for certain task is surpassing the budgeted amount	The team needs to reallocate funds from less important tasks.	Financial manager, which have capability to understand budgets and provide efficient financial insights.
R3: integration difficulties	(if) Norco's existing system is outdated and heavily customized	The team needs to consider middleware solutions to bridge the gap between the two systems (Ifinedo & Nahar, 2009).	Chief information officer, which have responsible for IT decision-making.
	(if) the new ERP system fails to integrate with the existing system.	The team needs to activate the backup system.	Chief information officer, which have responsible for IT decision-making.
R4: misalignment with business process	(if) Norco's business process is found to be too complex	Engage external business process consultants to review, streamline and recommend changes to existing business processes.	Senior manager of Norco, who are responsible for ensuring the operating process are efficient and effective.
	(if) a large number of end-user feedback report that certain features are not aligning with Norco's business process.	Engage experts to analyze the feedback as well as identify the root causes.	Project manager, who are responsible for the implementation of ERP system.

Figure 11. Contingency Plan for Norco's ERP Implementation

4.3.2 Time frames

A timeframe is an essential tool in project management that is used to help outline when each phase of a project will begin and end^[10], as well as to set out the sequence of activities, thus ensuring that the contingency plan for Norco's ERP system is activated and executed in accordance with the timetable.

Figure 12 shows the timeframe for contingency planning related to the risk of "scope creep", which is the predefined and prioritized list of stakeholders, and is a critical step between defining the project scope and assembling the project team.



(Figure 12. Timeframe for Managing Scope Creep in Norco's ERP Project)

Figure 13 shows the contingency plan timeframe associated with the risk of limited resources, that is, utilizing other available resources to complete tasks. Having this timeframe in place helps Norco's ERP project team to manage its resources holistically, which means that the project team has the opportunity to clearly identify alternative resources that may be in short supply, thus improving project efficiency and avoiding project delays.



(figure 13.Timeframe for Managing Limited Resources in Norco's ERP Project)

5. Conclusion

The purpose of this risk management report is to establish a comprehensive framework for identifying, prioritizing, and mitigating the risks associated with Norco's ERP system implementation. By proactively addressing these risks, the project team can allocate resources more effectively, minimize potential disruptions, and enhance the likelihood of a successful project outcome. This structured approach ensures that Norco's ERP system aligns with organizational goals, supports operational efficiency, and meets the expectations of stakeholders.

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