MACQUARIE University

Faculty of Science and Engineering

Department of Computing

Semester 1, 2024,

ASSIGNMENT 3 (GROUP PROJECT)

Project Plan Report

MQ Garbage Collection Mapping System (MQGCMS)

Group 43

COMP6770: Management of IT Systems and Projects

1 EXECUTIVE SUMMARY

COMPANY	MQ GARBAGE COLLECTION
PROJECT	MQGCMS

The project undertaken by MQ Garbage Collection (MQGC) aimed to address critical operational challenges and enhance overall efficiency by implementing a Geographic Information System (GIS) mapping project within the MQGC Management System (MQGCMS). Recognizing the urgent need for modernization, the project sought to revolutionize the company's waste collection processes.

1.1 Purpose of the Project

MQGC faced significant operational hurdles, including manual route management, lack of technology integration, communication gaps, rising costs, customer complaints, recruiting and training challenges, lack of project management discipline, and manual processes with limited visibility. These issues were negatively impacting the company’s effectiveness and profitability. The project’s primary goal was to overcome these challenges through strategic project management and advanced technology integration.

1.2 Challenges Addressed

MQGC faced numerous challenges that hindered its effectiveness and profitability. Manual route management was inefficient and labour-intensive, leading to increased fuel use and higher operational costs. The absence of GPS/GIS systems caused navigation difficulties and missed collections. Poor communication resulted in delays and customer dissatisfaction while rising fuel costs and vehicle wear added financial strain. Ongoing service issues led to customer complaints, damaging the company's reputation and stakeholder relationships. Ineffective training methods due to a lack of digital tools, a lack of project management discipline with projects lacking clear strategy and accountability, and outdated manual processes with limited visibility all contributed to reporting errors and inefficiencies.

1.3 Benefits Realized

The integration of GIS mapping technology significantly improved route planning, reduced fuel consumption, and minimized driver fatigue. This resulted in quicker collections, decreased operational costs, and enhanced customer satisfaction. Streamlined communication channels improved information

exchange, fostering better coordination and accountability. Proactive risk management and continuous improvement initiatives further strengthened operational efficiency and organizational resilience, ensuring a more robust and agile company.

1.4 Recommendations for Sustainable Success

To ensure sustained success, MQGC should implement comprehensive training programs to equip employees with the necessary skills to utilize GIS mapping technology and optimize routes. Regular risk analysis and mitigation efforts should be conducted to prevent service disruptions. Advanced communication tools, such as Slack for real-time communication and automated email alerts for transparency, should be integrated. Enhancing operational efficiency through GIS mapping for optimized route planning and automated task management can reduce costs and improve service quality. Continuous improvement initiatives should focus on regularly monitoring performance, analyzing data, and incorporating stakeholder feedback to remain agile and customer focused. Additionally, adopting integrated data management systems and automated reporting tools will improve operational visibility and financial performance, helping MQGC maintain a competitive edge in the waste management industry.

2 CURRENT SYSTEM OVERVIEW

MQGC is working in a setup filled with numerous operational hurdles. These are negatively affecting its effectiveness and profit-making ability. The organization is currently dealing with these problems:

2.1 Manual Route Management

MQGC currently manages routes manually, relying on human knowledge and physical maps. This outdated approach makes route planning laborious and error-prone, leading to inefficient routes with unnecessary detours, backtracking, and overlaps. Consequently, drivers spend more time on the road, increasing fuel use and operational costs. The absence of real-time data and tracking further hampers management's ability to quickly identify and resolve inefficiencies. Additionally, driver fatigue from long, repetitive routes and the lack of efficient processes exacerbate these issues, resulting in missed collections, service delays, and lower customer satisfaction. Without addressing these operational inefficiencies, MQGC struggles to optimize operations and deliver high-quality service.

2.2 Lack of Technology Integration

The current absence of advanced technology integration is exacerbating operational issues within MQGC. Without GPS or GIS mapping systems, drivers face the challenging task of accurately navigating complex routes. This limitation often leads to delays and missed collections, negatively impacting the overall efficiency of the waste collection process. Without digital mapping support, drivers find it difficult to locate specific addresses or collection points, resulting in subpar route navigation. As a result, operational delays occur, affecting the timely completion of collection routes and customer satisfaction.

2.3 Communication Gaps

Communication issues within MQGC are widespread and damaging. The lack of clear channels slows information exchange among drivers, management, and stakeholders, causing delays in problem-solving and customer dissatisfaction. Unattended collections or slow responses further harm MQGC's reputation, eroding trust and impacting its reliability and professionalism. Negative feedback spreads, affecting the brand image and deterring potential clients. Operational inefficiencies arise from disrupted coordination, leading to resource allocation problems and missed opportunities for improvement. Implementing structured communication channels is vital for MQGC to enhance efficiency, rebuild trust, and maintain its position in the waste management industry.

2.4 Rising Costs

Soaring fuel costs and excessive vehicle deterioration are causing financial issues for MQGC. Inefficient routes and long driving shifts are leading to increased fuel use and operational costs, affecting profits. With fuel prices on the rise, MQGC is under financial strain, making it difficult to maintain competitive pricing and operational viability. Additionally, the wear and tear on vehicles from long shifts is increasing maintenance costs and reducing the fleet’s lifespan, leading to more frequent repairs and replacements. These escalating costs are threatening MQGC’s financial stability, emphasizing the need for improved route planning, fuel use reduction, and cost control to ensure long-term profitability and competitiveness.

2.5 Customer Complaints

MQGC is dealing with a wave of customer complaints, ranging from missed collections to inconsistent schedules and poor service quality. These ongoing issues are damaging its reputation and straining relationships with key stakeholders, including local councils and residents. Customer dissatisfaction is undermining trust in MQGC’s reliability and professionalism, leading to increased scrutiny and pressure

to quickly address these service issues. Negative feedback is amplifying the community's perception of MQGC's shortcomings, which could deter potential clients and jeopardize existing contracts with local councils. It's crucial for MQGC to resolve these complaints to regain trust, enhance customer satisfaction, and safeguard its reputation in the competitive waste management industry.

2.6 Recruiting and Training Challenges

The manual approach to route management and navigation at MQGC is creating significant challenges in the recruitment and training of new drivers. Without access to digital route maps or standardized training materials, new hires are largely dependent on makeshift methods and learning on the job. This informal training strategy lacks uniformity and scalability, making it difficult to ensure comprehensive and effective training for all new drivers. As a result, new drivers often struggle with navigating complex routes and performing their duties efficiently, leading to increased errors and customer dissatisfaction.

2.7 Lack of Project Management Discipline

MQGC is struggling with the absence of solid project management methodologies, hindering its ability to systematically address operational issues. Projects often start without a clear roadmap or strategy, resulting in temporary solutions with limited long-term effectiveness. This lack of project management discipline leads to accountability problems, inefficient resource allocation, and difficulties in tracking project progress. As a result, MQGC faces challenges in managing escalating costs, customer complaints, and operational inefficiencies effectively. Adopting formal project management practices is vital for MQGC to improve organizational efficiency, enhance project outcomes, and systematically tackle operational issues.

2.8 Manual Processes and Limited Visibility

MQGC relies heavily on manual methods for data collection and analysis due to a lack of advanced technology and uniform reporting protocols. Operational metrics are tracked using a combination of spreadsheets and paper records, leading to reporting errors. Without real-time insight into key performance indicators, it's difficult for MQGC to accurately assess operational efficiency and financial performance. The lack of integrated systems hinders comprehensive reporting, making it hard to identify improvement areas or allocate resources effectively. This outdated approach limits MQGC's ability to optimize operations and increase profitability. Overall, the system is currently facing a complex web of interrelated challenges. These include managing routes manually, dealing with communication

breakdowns, and grappling with escalating costs. If these issues aren't addressed, they pose a risk to the company's stability and its future prosperity in the waste management sector.

3 UPGRADED SYSTEM OVERVIEW

The implementation of an upgraded system, designed to address the various challenges of the existing systems mentioned above, represents a significant advancement. By leveraging advanced solutions and strategic management, this new system introduces several vital improvements to MQGC's workflow.

3.1 GIS Mapping Integration

A Geographic Information System (GIS) is a comprehensive toolkit that offers capabilities for input, analysis, storage, retrieval, and visualization of spatial data, facilitating tasks such as mapping, modelling, and decision-making across various fields (Skidmore et al., 1996). Recognizing the importance of technology in route management, MQGC will integrate GIS mapping technology into its operations. This integration will provide drivers with real-time navigation assistance and optimized route planning, addressing inefficiencies associated with manual route management and reducing fuel consumption. Furthermore, GIS mapping will enhance the training process for new recruits. Digital route guides and real-time navigation support will help new drivers quickly learn their routes, reducing the learning curve and minimizing errors. This technology-driven approach will make driver onboarding more efficient and effective, ensuring drivers can confidently navigate their routes from the start.

3.2 Streamlined Communication Channels

The communication gaps in the previous system will be addressed by implementing streamlined channels within MQ Garbage Collection. Digital tools like Slack, known for their user-friendly interface and robust messaging, will be complemented by email alerts. This ensures stakeholders receive transparent updates on schedules, disruptions, and complaint resolutions. This framework will promote collaboration and accountability, allowing supervisors to efficiently share information with drivers and management. Standardized reporting protocols will ensure consistent updates, fostering transparency. Overall, efficient communication will lead to improved customer satisfaction and stronger stakeholder relationships.

3.3 Operational Efficiency Enhancements

The updated system will enhance operational efficiency by streamlining processes and optimizing resource allocation. Using GIS mapping for route planning and scheduling, MQGC aims to reduce driver

fatigue, vehicle wear, and fuel consumption. Automated task management will improve coordination between drivers, maintenance, and back-end staff, further boosting efficiency and lowering costs. Overall, these technology-driven improvements promise a bright future for MQGC operations.

3.4 Proactive Risk Management

MQGC will foster a culture of proactive risk management, enabling the organization to foresee and mitigate challenges before they escalate. With comprehensive risk analysis and mitigation strategies, MQGC can address route disruptions, equipment failures, and adverse weather conditions in advance. This approach will minimize service disruptions and ensure operational continuity, securing a future where potential risks are effectively managed for smooth, uninterrupted operations.

3.5 Continuous Improvement Initiatives

Recognizing that organizational success is an ongoing journey, MQGC will cultivate a culture of continuous improvement. Regular performance monitoring, data analysis, and stakeholder feedback mechanisms will keep the organization agile and responsive to customer needs and industry trends. This commitment will allow MQGC to adapt swiftly to market changes, maintain its competitive edge, and ensure long-term profitability. The future of MQGC will be one of constant evolution and adaptation, driven by a dedication to improvement and responsiveness.

3.6 Automated Efficiency and Financial Management

MQGC is set to significantly enhance its efficiency reports and financial processes through modern technology and streamlined operations. Integrated data management systems and automated reporting tools will provide accurate, timely efficiency reports, offering stakeholders actionable insights into operational metrics. Real-time data analysis will help MQGC identify trends, track performance, and optimize resource allocation. Advanced financial management software will streamline budgeting, forecasting, and revenue generation, boosting financial performance and profitability. These initiatives will transition MQGC from manual, error-prone methods to a data-driven approach, positioning the company for sustained success and growth. Overall, the upgraded system offers a comprehensive solution to MQGC's challenges. Leveraging GIS mapping technology, optimizing communication, enhancing operational efficiency, implementing proactive risk management, and committing to continuous improvement, MQGC is poised for enduring success in the waste management sector.

4. PROJECT SCOPE & BENEFITS

4.1 Project Scope Details

Project Title: Upgraded MQGC Management System Implementation.

Project Justification:

The implementation of an upgraded management system is crucial for MQ Garbage Collection to address the multitude of challenges impacting its operations, including inefficient route management, communication gaps, operational inefficiencies, and risk management concerns. By leveraging innovative solutions and strategic management, this project aims to enhance MQGC's workflow, improve operational efficiency, and ultimately deliver superior service to its customers.

Project Objectives:

1. Implement GIS mapping integration into MQGC operations to optimize route planning and navigation.
2. Streamline communication channels within MQGC to improve collaboration and transparency.
3. Enhance operational efficiency through the introduction of automated task management systems.
4. Instil a culture of proactive risk management to pre-emptively address potential challenges.
5. Foster continuous improvement initiatives to adapt to changing customer needs and industry trends.
6. Implement automated efficiency and financial management processes to enhance operational visibility and financial performance.

System Components and Functionalities:

1. GIS Mapping Integration:
    - Component: GIS Mapping Software
    - Functionality: Realtime navigation assistance, optimized route planning.
2. Communication Channels:
    - Component: Digital Communication Tools (e.g., Slack, Email Alerts)
    - Functionality: Transparent and timely updates on collection schedules and service disruptions.
3. Operational Efficiency Enhancements:
    - Component: Automated Task Management Systems
    - Functionality: Smoother coordination between drivers, maintenance crews, and backend staff.
4. Proactive Risk Management:
    - Component: Risk Analysis and Mitigation Strategies
    - Functionality: Pre-emptively address potential challenges such as route disruptions and equipment failures.

5. Continuous Improvement Initiatives:
    - Component: Performance Monitoring Mechanisms
    - Functionality: Regular data analysis and stakeholder feedback to adapt to changing needs and trends.
6. Automated Efficiency and Financial Management:
    - Component: Integrated Data Management Systems, Financial Management Software
    - Functionality: Streamlined efficiency reports, improved financial performance through data driven insights.

Deliverables and Deadlines:

Deliverable	Deadline	Cost of Implementation
GIS Mapping Software Implementation	6 months	$100,000
Digital Communication Tools Integration	3 months	$50,000
Automated Task Management Systems Implementation	9 months	$150,000
Proactive Risk Management Strategies Implementation	Throughout project duration	Included in project management budget
Continuous Improvement Initiatives Implementation	Ongoing	Included in project management budget
Automated Efficiency and Financial Management Processes Implementation	12 months	$200,000

Assumptions:

1. The deliverable's deadline and cost of implantation are assumed value as sufficient data was not available to make close assumptions and online source was consulted to derive the assumed value (Tully, 2023).

4.2 Expected Benefits

1. Improved Route Efficiency
    - Description: Implementation of GIS mapping integration will optimize route planning and navigation, leading to more efficient garbage collection routes.
    - Success Criteria:

- Reduction in total distance travelled by garbage collection vehicles by 20% within the first six months.
- Increase in the number of households serviced per route by 15% within the first three months.

2. Enhanced Communication and Collaboration
   - Description: Streamlined communication channels will improve collaboration and transparency within the organization, leading to faster response times and better service delivery.
   - Success Criteria:
     - Decrease in response time to customer inquiries or complaints by 30% within the first three months.
     - Increase in employee satisfaction survey scores related to communication and collaboration by 20% within the first six months.
3. Operational Efficiency
   - Description: Introduction of automated task management systems will streamline operational processes, reducing manual errors and optimizing resource allocation.
   - Success Criteria:
     - Decrease in average collection time per route by 25% within the first nine months.
     - Reduction in overtime hours worked by drivers and maintenance crews by 15% within the first six months.
4. Proactive Risk Management
   - Description: Instilling a culture of proactive risk management will enable the organization to identify and mitigate potential challenges before they escalate, ensuring operational continuity.
   - Success Criteria:
     - Decrease in the number of service disruptions due to unforeseen circumstances by 50% within the first six months.
     - Increase in employee engagement in risk identification and mitigation activities by 30% within the first three months.
5. Continuous Improvement
   - Description: Fostered culture of continuous improvement will enable the organization to adapt to changing customer needs and industry trends, maintaining a competitive edge.
   - Success Criteria:
     - Implementation of at least two customer driven improvement initiatives per quarter.

- Increase in market share within the waste management sector by 10% within the first year.

6. Improved Financial Performance
    - Description: Implementation of automated efficiency and financial management processes will improve operational visibility and financial performance.
    - Success Criteria:
        - Decrease in operational costs related to fuel consumption and vehicle maintenance by 15% within the first year.
        - Increase in revenue generated from new customer acquisitions or service expansions by 10% within the first year.

Assumptions:

1. Eby, 2023 was consulted to design the success criteria the problem statement specific benefits.

4.3 Benefit Realization Plan

1. Improved Route Efficiency:
    - Expected Outcome: Reduced travel time and fuel consumption through optimized route planning.
    - Strategies for Realizing Outcome: Implementation of GIS mapping integration, training drivers on new routes.
    - Key Performance Indicators (KPIs):
        - Total distance travelled by garbage collection vehicles.
        - Number of households serviced per route.
    - Responsibilities:
        - Project Manager: Oversee implementation of GIS mapping integration.
        - Operations Manager: Coordinate driver training and route optimization efforts.
    - Timeline for Implementation: Six months

2. Enhanced Communication and Collaboration:
    - Expected Outcome: Improved communication channels leading to faster response times and better service delivery.
    - Strategies for Realizing Outcome: Implementation of digital communication tools, training on new communication protocols.

- Key Performance Indicators (KPIs):
    - Response time to customer inquiries or complaints.
    - Employee satisfaction survey scores related to communication and collaboration.
- Responsibilities:
    - Project Manager: Coordinate implementation of digital communication tools.
    - Human Resources Manager: Conduct employee training sessions.
- Timeline for Implementation: Three months

3. Operational Efficiency:
    - Expected Outcome: Streamlined operational processes leading to reduced manual errors and optimized resource allocation.
    - Strategies for Realizing Outcome: Introduction of automated task management systems, process improvement initiatives.
    - Key Performance Indicators (KPIs):
        - Average collection time per route.
        - Overtime hours worked by drivers and maintenance crews.
    - Responsibilities:
        - Project Manager: Oversee implementation of automated task management systems.
        - Operations Manager: Identify and lead process improvement initiatives.
    - Timeline for Implementation: Nine months

4. Proactive Risk Management:
    - Expected Outcome: Identification and mitigation of potential challenges before they escalate, ensuring operational continuity.
    - Strategies for Realizing Outcome: Establishing risk management procedures, training on risk identification and mitigation.
    - Key Performance Indicators (KPIs):
        - Number of service disruptions due to unforeseen circumstances.
        - Employee engagement in risk management activities.
    - Responsibilities:
        - Project Manager: Develop risk management plan and procedures.
        - Risk Management Team: Identify and mitigate potential risks.
    - Timeline for Implementation: Throughout project duration

5. Continuous Improvement:

- Expected Outcome: Adaptation to changing customer needs and industry trends, maintaining a competitive edge.
- Strategies for Realizing Outcome: Foster culture of continuous improvement, implement customer driven improvement initiatives.
- Key Performance Indicators (KPIs):
    - Number of customer driven improvement initiatives implemented.
    - Market share within the waste management sector.
- Responsibilities:
    - Project Manager: Facilitate continuous improvement initiatives.
    - Marketing and Sales Team: Identify market trends and customer needs.
- Timeline for Implementation: Ongoing

6. Improved Financial Performance:

- Expected Outcome: Improved operational visibility and financial performance through automated efficiency and financial management processes.
- Strategies for Realizing Outcome: Implementation of integrated data management systems, financial management software.
- Key Performance Indicators (KPIs):
    - Operational costs related to fuel consumption and vehicle maintenance.
    - Revenue generated from new customer acquisitions or service expansions.
- Responsibilities:
    - Project Manager: Oversee implementation of data management systems and financial management software.
    - Finance Manager: Monitor financial performance and budget adherence.
- Timeline for Implementation: Twelve months

Additional Measurements:

- Conduct regular stakeholder satisfaction surveys to assess perceived improvements in service quality and customer satisfaction.
- Track project progress through regular performance review meetings and status reports.
- Monitor actual outcomes against projected benefits and adjust strategies as necessary to ensure alignment with organizational goals.

- Review financial reports to assess cost savings and revenue generation attributable to project initiatives.
- Utilize employee feedback mechanisms to gauge employee engagement and satisfaction with implemented changes.

Assumptions:

1. Mawhinney, 2022 was used to design the benefits specific KPIs

5. HUMAN RESOURCE MANAGEMENT(HRM)

Project Human Resource Management is a vital knowledge area that focuses on organizing, managing, and leading the project team. In the context of MQGC, effective human resource management is essential to address the company's operational challenges and ensure the successful implementation of the MQGCMS. This knowledge area encompasses the processes of planning, acquiring, developing, and managing the project team. Given the rising costs and inefficiencies identified at MQGC, including the difficulty in recruiting and training new drivers, effective human resource management will play a critical role in optimizing team performance and ensuring the project's success. By leveraging structured HR management practices, the project aims to streamline recruitment, enhance team capabilities, and ensure smooth operation and maintenance of the new GIS mapping system, ultimately contributing to improved service delivery and cost efficiency. The HRM encompasses several critical processes for effectively organizing and directing the project team. These processes include the following, each having specific inputs, steps and outputs.

5.1 Plan Human Resource Management

This process involves identifying and documenting the project roles, responsibilities, necessary skills, reporting relationships, and developing a comprehensive staffing management plan. This foundational step ensures clarity in understanding and articulating the human resource requirements for project success, especially considering the involvement of external vendors for development.

1. Inputs: Project Management Plan, Activity Resource Requirements, Enterprise Environmental Factors, and Organizational Process Assets.
2. Steps: The steps leading to the output of the HRM planning process are as follows.
   - Identifying Project Roles and Responsibilities

   This step involves creating a detailed breakdown of roles required for the project. For the MQGCMS project, roles such as GIS specialists, project managers, and training coordinators

within MQGC need to be identified. Additionally, the roles and responsibilities of the outsourced development team, including software developers and testers, should be clearly defined to ensure seamless collaboration.

- Creating Organizational Charts

These charts help visualize the project team structure and clarify reporting relationships, which is crucial for ensuring smooth communication and authority flows. For MQGCMS, the organizational chart will depict how the internal project team interacts with the outsourced development team, highlighting key positions and reporting lines for both internal and external stakeholders.

- Developing the Staffing Management Plan

This plan outlines how and when team members will be recruited, onboarded, retained, and released. It includes considerations for the unique skills needed for MQGCMS, such as expertise in systems integration and project management. The plan will also address the training needs for existing staff to ensure they can effectively use the new system. Additionally, the plan will outline how to manage the relationship with the outsourced development team, including communication protocols, performance monitoring, and issue resolution mechanisms.

3. Outputs: Human resource management plan (includes, project roles and responsibilities documentation, project organizational charts and the staffing management plan).

5.2 Acquire Project Team

During this stage, the availability of human resources is confirmed, and the team required to carry out the project activities is assembled. This process is crucial for securing the right talent and skills to meet the project's objectives.

1. Inputs: Human Resource Management Plan, Enterprise Environmental Factors, Organizational Process Assets
2. Steps: The steps leading to the outputs are as follows.
   - Pre-assignment

   In the project, pre-assignment occurs when specific team members are designated in advance due to their unique or essential skills highlighted in the project proposal or identified as critical in the project charter. For MQGCMS, this ensures that key roles requiring specialized knowledge of GIS and GPS technologies are filled by the most qualified individuals from the start.
   - Negotiation

Negotiation focuses on securing the best possible talent and resources. The project management team negotiates with other managers to ensure the availability of skilled staff and coordinates with other project teams to efficiently allocate shared or scarce resources. This includes negotiating with external organizations if specific expertise is needed that is unavailable internally.

- Acquisition

For MQGCMS, acquisition becomes necessary when internal resources are insufficient to meet the project's specialized demands. The project may turn to external sources to acquire the required services, such as hiring individual consultants with expertise in GIS systems or subcontracting parts of the work to specialized firms. This approach allows the project to fill skill gaps effectively and ensure that all project requirements are adequately met.

- Recruitment

Given the specialized nature of the MQGCMS project, the recruitment process might involve targeted headhunting and collaboration with technical schools or universities to find suitable candidates. This is particularly important for roles that need to be filled internally to support the integration and operation of the new system.

- Selection

The selection process for the MQGCMS project is rigorous, including technical assessments, interviews, and practical demonstrations, particularly in GIS system management. This ensures candidates meet the high standards required for the project.

- Onboarding

Properly integrating new team members into the project through structured onboarding programs, which include training on the project's specific tools and methodologies. This ensures that all team members, whether internal or external, are fully prepared to contribute effectively to the project.

3. Outputs: Project staff assignments, Resource calendars, Project management plan updates.

5.3 Develop Project Team

This process focuses on enhancing the competencies of team members, improving interactions among them, and fostering a supportive team environment. By investing in team development, the project aims to boost overall performance and ensure a collaborative working atmosphere.

1. Inputs: HRM plan, Project staff assignments, Resource calendars.
2. Steps: The steps leading to the outputs are as follows.

- Training and Knowledge Development

Conduct specialized training sessions to ensure all team members are proficient in using the newly implemented GIS software and customized tools. These training sessions are crucial as they enable the staff to manage and utilize the technological features essential for the project's success. For MQGCMS, this might include GIS system navigation, data management, and troubleshooting.

- Team-Building Activities

Team-building activities are strategically incorporated into the project to foster better teamwork and enhance interpersonal relationships among team members. Given the project's reliance on collaborative efforts across various departments and potentially geographically dispersed teams, these activities are vital for maintaining a harmonious and productive project environment. Activities might include workshops, collaborative problem-solving exercises, and social events.

- Performance Assessments

Regular performance assessments are a key component of the project, used to continuously monitor and evaluate team members' contributions towards project goals. These assessments provide essential feedback to team members, guide the development of future training programs, and are instrumental in refining strategies to enhance overall project performance. This continuous feedback loop ensures that the team remains aligned with the project's objectives and standards.

3. Outputs: Team performance reports, Enterprise environmental factors updates.

5.4 Manage Project Team

This final process involves monitoring the performance of team members, offering timely feedback, resolving any arising issues, and making necessary adjustments for team effectiveness. This ongoing management is essential for maintaining high levels of team performance and ensuring alignment with project goals.

1. Inputs: HRM plan, Project staff assignments, Team performance reports, Issue log, Work performance reports, Organizational process assets.
2. Steps: The steps leading to the outputs are as follows.

- Performance Monitoring

Performance monitoring involves continuous observation and evaluation of team members regarding the project's goals. This consistent monitoring ensures that the project stays on track

and allows for timely interventions if performance deviates from expectations. For MQGCMS, this could involve tracking metrics related to GIS data accuracy, adherence to collection schedules, and overall system performance.

- Feedback and Recognition

Providing constructive feedback and recognizing achievements are critical aspects of the project management strategy. This approach motivates the team by acknowledging their efforts and successes, fostering a culture of continuous improvement and high performance. Regular feedback sessions can help identify areas for improvement and highlight exemplary performance, ensuring the team remains engaged and committed to the project's objectives.

- Conflict Management

This step involves proactive strategies to address and resolve disputes that may emerge from the high-pressure environment of the project. The project aims to maintain a collaborative and productive team atmosphere by establishing clear communication channels and conflict resolution procedures. For MQGCMS, this might include regular team meetings, an open-door policy for grievances, and structured mediation processes to address conflicts promptly and effectively.

3. Outputs: Change requests, Project management plan updates, Project document updates, Enterprise environmental factors updates, Organisational process assets updates.

6. COMMUNICATIONS MANAGEMENT(CM)

Project Communications Management (CM) is crucial for ensuring that timely and appropriate information is generated, collected, distributed, stored, retrieved, and disposed of during the project lifecycle. For MQGC, effective communication is key to addressing the company's issues such as customer complaints, route inefficiencies, and coordination with various stakeholders. The implementation of the MQGCMS requires a comprehensive communications management plan to facilitate clear and consistent communication among all project stakeholders, including drivers, management, customers, and local councils. By establishing robust communication processes, MQGC aims to enhance stakeholder engagement, minimize misunderstandings, and ensure that project progress and changes are effectively communicated, thereby supporting the successful deployment and operation of the new system. The project encompasses several key CM processes for effectively communicating with the project team. These processes include the following, each having specific inputs, steps and outputs.

6.1 Plan Communications Management

The process involves crafting a suitable strategy and plan for project communications, tailored to the stakeholder's informational needs and requirements, leveraging available organisational resources.

1. Inputs: Project management plan, Stakeholder register, Enterprise environmental factors, Organisational process assets.
2. Steps: The steps leading to the outputs are as follows.
   - Identifying Stakeholders

   The initial step involves recognizing all parties interested in the project. Stakeholders for the MQGCMS include internal groups like project team members, department heads, and executive management, as well as external entities such as local city councils, residents affected by waste management practices, environmental regulators, and service contractors. Proper identification ensures that all relevant parties are considered in the communication plan.
   - Determining Information Needs

   The next step is to determine the specific information needs of each stakeholder. For MQGCMS, this involves understanding what information is critical for each group, such as progress updates for management, technical details for team members, and project impact information for public stakeholders. Decisions need to be made on the level of detail and the most effective format to deliver this information, whether it's summaries for higher management or detailed reports for technical staff.
   - Defining Communication Methods

   For effective communication across the project, various methods are selected based on their suitability for the message and the audience. These methods include face-to-face meetings for internal team collaboration, email updates for regular stakeholder engagement, interactive project dashboards for real-time data sharing, and formal reports for regulatory compliance and detailed project analysis. Selecting the right methods ensures that information is conveyed effectively and efficiently.
   - Establishing a Communications Schedule

   Finally, a communication schedule is established, determining how frequently each stakeholder group should receive updates and through which methods. For instance, project teams may have daily stand-ups or weekly meetings, city councils and regulatory bodies might receive monthly project status reports, and residents might be updated through quarterly newsletters or public

webinars. This schedule helps in maintaining consistent and timely communication throughout the project lifecycle.

3. Outputs: Communications management plan, Project document updates.

6.2 Manage Communications

Managing Communications in the project involves creating, collecting, distributing, storing, and ultimately disposing of project information as outlined in the communications management plan. This process ensures that all project stakeholders, from team members to city councils and residents, experience efficient and effective information flow, facilitating clear and consistent communication throughout the project lifecycle.

1. Inputs: Communications management plan, Work performance reports, Enterprise environmental factors, Organisational process assets.
2. Steps: The steps leading to the outputs are as follows.
   - Creating Information

   The project team produces accurate and timely updates tailored to the specific needs of various stakeholders. This includes detailed technical reports for project team members, summary updates for management, and easy-to-understand project impacts for city councils and the public. These updates are essential for keeping all parties informed about the project's progress, challenges, and achievements.
   - Distributing Information

   Information distribution is carefully planned to ensure it reaches all intended recipients effectively. This includes conducting regular project briefings for internal stakeholders, distributing newsletters to keep the local community informed, and regularly updating the project intranet with the latest developments and resources. Effective distribution ensures that stakeholders receive the information they need when they need it.
   - Storing Information

   All project communications are securely stored in formats that comply with data protection laws to ensure security and ease of access. This allows for efficient management of project records and facilitates easy retrieval of historical data for all stakeholders. Proper storage practices ensure that critical information is preserved and can be accessed as needed.
   - Retrieving Information

Systems are implemented to enable stakeholders to access necessary information easily. This includes digital archives accessible through the project's intranet and dedicated communication channels that stakeholders can use to request specific information. Efficient retrieval systems ensure that stakeholders can obtain the information they need without delays, supporting informed decision-making.

3. Outputs: Project communications, Project management plan updates, Project document updates, Organisational process assets updates.

6.3 Control Communications

In the MQGCMS Project, Control Communications involves the ongoing monitoring and adjustment of communication strategies across the project lifecycle. This process ensures that the information needs of all stakeholders are continuously met, facilitating an effective flow of information at all times. This proactive approach is crucial for maintaining clear and effective communication among all involved parties throughout the project.

1. Inputs: Communications management plan, Work performance reports. Enterprise environmental factors, Organizational process assets.
2. Steps: The steps leading to the outputs are as follows.
   - Monitoring Effectiveness

   Regularly assess the effectiveness of communication efforts. This involves checking if stakeholders are receiving the information they need and whether they are satisfied with the information provided. Surveys, feedback forms, and direct stakeholder interactions can be used to gather this information.
   - Adjusting Plans

   Based on feedback and the ongoing assessment of project communication needs, adjust communication strategies and plans as necessary. This might involve changing the frequency of updates, altering the format of reports, or introducing new communication channels to better meet stakeholder needs.

3. Outputs: Work performance information, Change requests, Project management plan updates, Project documents updates, Organizational process assets updates.

7. RISK MANAGEMENT PLAN

7.1 Qualitative Risk Analysis

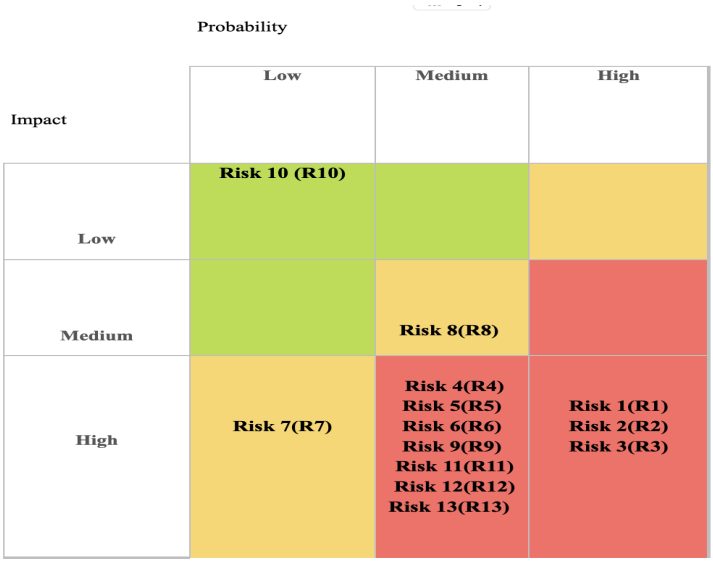

Fig: Qualitative Analysis of System

ID	Rank	Risk	Description	Category	Root Cause	Proximity	Probability	Impact	Status	Responsible	Risk Type
R1	1	Fuel Cost Escalation	Risk of significant increases in fuel prices impacting operational costs	Financial Risk	Volatility in global fuel markets	High	High	High	Active	Finance Department	Threat
R2	2	Customer Complaints	Increased complaints from customers regarding missed collections or service quality	Stakeholder Risk	Poor communication and service delivery	High	High	High	Active	Customer Service Department	Threat
R3	3	Technology Integration	Challenges in integrating GIS mapping technology into existing systems, leading to disruptions	Technology Risk	Insufficient training and support	High	High	High	Active	IT Department	Threat
R4	4	Route Optimization Delays	Delays or challenges in optimizing collection routes, leading to inefficiencies and missed pickups	Operational Risk	Inadequate planning and data analysis	High	Medium	High	Active	Operations Team	Threat
R5	5	Vehicle Breakdowns	Potential breakdowns or maintenance issues affecting the fleet's ability to conduct collections	Operational Risk	Aging fleet and inadequate maintenance	Medium	Medium	High	Active	Maintenance Team	Threat
R6	6	Employee Turnover	Loss of skilled personnel leading to disruptions in workforce continuity and knowledge transfer	People Risk	Inadequate retention strategies	Medium	Medium	High	Active	HR Department	Threat
R7	12	Regulatory Compliance	Failure to comply with waste management regulations and environmental laws	Compliance Risk	Lack of understanding of regulations	Medium	Low	High	Active	Legal Department	Threat
R8	11	Weather Disruptions	Disruptions to operations caused by inclement weather conditions, such as storms or floods	External Risk	Lack of contingency planning	Medium	Medium	Medium	Active	Operations Team	Threat
R9	7	Budget Overrun	Exceeding budget allocations due to unforeseen expenses or cost overruns	Financial Risk	Inaccurate cost estimation	Medium	Medium	High	Active	Finance Department	Threat
R10	13	Minor IT Glitches	Occasional minor glitches or technical issues with the GIS mapping technology may occur, resulting in temporary disruptions to route optimization or navigation.	Technology Risk	Insufficient training and support in using the GIS mapping	Low	Low	Low	Active	IT Department	Threat
R11	8	Data Security Breach	Unauthorized access or breach of sensitive data stored within the waste management system, including customer information or operational data.	Technology Risk	Inadequate cybersecurity measures or vulnerabilities in the system's infrastructure.	Medium	Medium	High	Active	IT Department	Threat
R12	9	Strategic Partnership	Establishment of strategic partnerships with waste management organizations for enhanced efficiency and resource sharing	People Risk	Identifying potential partners	Medium	Medium	High	Active	Management Team	Opportunities
R13	10	Market Expansion	Opportunity for expanding the market presence and reaching new customer segments	Market Risk	Identification of potential markets and partners	Medium	Medium	High	Active	Marketing Department	Opportunities

Fig: Risk Register

7.2 Quantitative Risk Analysis

1. Fuel Cost Escalation: This risk involves significant increases in fuel prices impacting operational costs. The assumption here is that if fuel prices escalate significantly, it could lead to a substantial increase in operational expenses, such as fuel for vehicles, which could cost the company $100,000.

2. Customer Complaints: Increased customer complaints regarding missed collections or service quality could result in reputational damage and potential loss of business. According to a report by NewVoice Media (2018), businesses lose a massive $75 billion every year due to poor customer service. While the exact impact on MQ Garbage Collection may vary, we estimate that addressing customer complaints and avoiding potential business losses could cost the company around $50,000.

3. Technology Integration: The cost for Custom integrations varies widely in cost, ranging from $20,000 to over $100,000 (Venn, 2023). Challenges in integrating GIS mapping technology could lead to disruptions in operations and require additional resources to address. The estimate here is that resolving integration issues could cost the company $70,000.

4. Route Optimization Delays: Delays in optimizing collection routes could lead to inefficiencies and missed pickups, resulting in additional operational costs. We estimated that addressing these delays could cost the company $70,000.

5. Vehicle Breakdowns: Addressing potential breakdowns or maintenance issues affecting the fleet could incur varying costs, ranging from $280 to $720 per vehicle (Cordano, 2024). Here, we assumed that addressing vehicle breakdowns could cost the company an estimated $60,000 in total.

6. Employee Turnover: Addressing the loss of skilled personnel due to turnover could result in varying costs depending on the level of the employee. Replacing an entry-level employee typically costs between 30% to 40% of their annual salary, while replacing a mid-level employee may cost up to 150% of their salary. For highly skilled employees, the cost can be as high as 400% of their salary (Abdi, 2024). Here, we estimated that addressing employee turnover could cost the company approximately $70,000

7. Regulatory Compliance: Ensuring compliance with waste management regulations is essential to avoid penalties or fines. On average, businesses with 6-20 people spend around $15,417 on compliance

costs (Lewis et al., 2022). However, failure to comply could result in additional expenses. Here, we estimated that addressing compliance issues could cost the company approximately $20,000.

8. Weather Disruptions: Disruptions caused by inclement weather conditions could require additional resources for contingency planning and operational adjustments. We estimated that addressing weather disruptions could cost the company $40,000.

9. Budget Overrun: Exceeding budget allocations due to unforeseen expenses or cost overruns could strain financial resources. We estimated that addressing budget overruns could cost the company $50,000.

10. Minor IT Glitches: While minor IT glitches may not directly incur significant monetary costs, they can still lead to indirect expenses such as IT support services, software updates, and potential productivity losses due to system downtime or inefficiencies. We estimated that addressing minor IT glitches could cost the company $5,000.

11. Data Security Breach: A security breach could result in financial losses due to data recovery, legal fees, and potential fines. Cost of a Data Breach Report by IBM(2023) reveals that for companies with fewer than 500 workers, the average impact of a data breach is $3.31 million, with an average cost per affected record of $164 Considering these findings, the estimated cost of addressing a data breach could be revised to around $80,000, taking into account the potential financial repercussions and the need for comprehensive remediation efforts.

12. Strategic Partnership: The assumption of $150,000 reflects the potential revenue increase anticipated from establishing strategic partnerships. These partnerships are expected to enhance operational efficiency and resource utilization, leading to expanded market presence and increased profitability.

13. Market Expansion: The assumption of $120,000 represents the projected revenue growth from market expansion efforts. The company anticipates increased sales and profitability by reaching new customer segments and expanding its market presence, contributing positively to its financial performance.

As the impact monetary values are assumed already, now, we'll assess the probabilities

Based on the diagram below, we have assigned the probability for the high risk as 0.9, medium risk as 0.5, and low risk as 0.1.

According to Usmani (2024),

EMV = Impact * Probability

The calculated EMV for all the risk events are shown below.

Risk	Probability	Impact	Assumed Impact Value	EMV Calculation	EMV
Fuel Cost Escalation (R1)	High (0.9)	High	-$100,000	0.9 * -$100,000	-$90,000
Customer Complaints (R2)	High (0.9)	High	-$50,000	0.9 * -$50,000	-$45,000
Technology Integration (R3)	High (0.9)	High	-$70,000	0.9 * -$70,000	-$63,000
Minor IT Glitches (R10)	Low (0.1)	Low	-$5,000	0.1 * -$5,000	-$500
Strategic Partnership (R12)	Medium (0.5)	High	+$150,000	0.5 * +$150,000	+$75,000

Similarly for all the risks,

Risk	Probability	Impact	EMV
Fuel Cost Escalation	0.9	-100000	-90000
Customer Complaints	0.9	-50000	-45000
Technology Integration	0.9	-70000	-63000
Route Optimization Delays	0.5	-40000	-20000
Vehicle Breakdowns	0.5	-30000	-15000
Employee Turnover	0.5	-60000	-30000
Regulatory Compliance	0.2	-20000	-4000
Weather Disruptions	0.5	-25000	-12500
Budget Overrun	0.5	-50000	-25000

Minor IT Glitches	0.1	-5000	-500
Data Security Breach	0.5	-80000	-40000
Strategic Partnership	0.5	+150000	75000
Market Expansion	0.5	120000	60000

7.3 Mitigation Strategies for Negative Risk (Threats)

1. Fuel Cost Escalation (R1)

- Implement a fuel hedging strategy to mitigate the impact of price fluctuations.
- Invest in fuel-efficient vehicles or alternative fuel technologies to reduce dependency on traditional fuels.
- Negotiate long-term contracts with fuel suppliers to stabilize costs over time.
- Explore route optimization software to minimize fuel consumption during collections.

2. Customer Complaints (R2)

- Enhance communication channels with customers to promptly address complaints and improve service quality.
- Conduct regular training sessions for collection staff to ensure adherence to collection schedules and service standards.
- Implement a proactive customer feedback mechanism to identify potential issues and address them before the escalation.

3. **Technology Integration (R3)**
   - Provide comprehensive training programs for staff to familiarize them with the GIS mapping technology and its integration into existing systems.
   - Establish robust technical support mechanisms to address any challenges or disruptions encountered during the integration process.
   - Conduct thorough testing and piloting phases to identify and rectify potential issues before full-scale implementation.
4. **Route Optimization Delays (R4)**
   - Invest in advanced route optimization software to streamline collection routes and minimize inefficiencies.
   - Conduct regular data analysis to identify areas for route optimization and implement changes accordingly.
   - Enhance coordination between operations teams to ensure timely adjustments to routes based on changing requirements.

5. **Vehicle Breakdowns (R5)**
    - Implement a preventative maintenance strategy to take care of possible problems before they become serious problems.
    - Invest in fleet management technology to monitor vehicle performance in real time.
    - Maintain a contingency fleet to minimize disruptions in case of unexpected breakdowns.
6. **Employee Turnover (R6)**
    - Develop retention strategies such as performance incentives, career development opportunities, and employee recognition programs to reduce turnover rates.
    - To lower turnover rates, create employee appreciation initiatives, professional development opportunities, and performance incentives as retention methods.
    - Encourage a positive work environment that emphasizes employee well-being, work-life balance, and opportunities for professional growth.
7. **Regulatory Compliance (R7)**
    - Establish a dedicated compliance team to stay informed on relevant regulations and ensure ongoing adherence.
    - Perform regular compliance audits to find any non-compliance areas and quickly take appropriate action.
8. **Weather Disruptions (R8)**
    - Develop a robust contingency plan that includes alternative routes and schedules for garbage collection during adverse weather conditions.
    - Invest in weather monitoring technology to anticipate disruptions and proactively adjust operations accordingly.
9. **Budget Overrun (R9)**
    - Using the software for budget tracking to monitor expenses in real-time and identify areas of potential overspending.
    - Implement cost-saving initiatives such as bulk purchasing discounts and negotiation with vendors for favourable terms.
10. **Minor IT Glitches (R10)**
    - Implement regular system maintenance and updates to address potential glitches before they escalate.
    - Establish a dedicated IT support team to address and resolve any technical issues that arise promptly.
11. **Data Security Breach (R11)**

- Strengthen cybersecurity measures by deploying advanced encryption protocols and firewall systems.
- To find weaknesses and counter possible threats, do frequent penetration tests and security audits.
- Educate employees on best practices for data protection and enforce strict access controls to safeguard sensitive information.

7.4 Response Strategies for Positive Risks (Opportunities)

1. Strategic Partnership (R12)

- Actively seek out potential partners in the waste management industry to enhance operational efficiency and resource sharing.
- Develop a comprehensive partnership strategy outlining mutual benefits, roles, and responsibilities to maximize value creation.
- Enhance the potential for success by leveraging existing relationships and networks within the waste management sector.

2. Market Expansion (R13)

- Identify neglected markets and prospects for expansion in the waste management industry by doing market research and analysis.
- To increase awareness and draw in new clients, create targeted advertising strategies and initiatives for promotion.

8. RECOMMENDATIONS

Based on the challenges identified in the current system overview and the enhancements proposed in the upgraded system overview, the following recommendations are put forth to address operational inefficiencies and improve overall performance:

8.1 Comprehensive Training Programs

To maximize the benefits of the upgraded system, MQ Garbage Collection (MQGC) needs to provide its employees with extensive training initiatives. Employee training and development are crucial for enhancing operational efficiency within organizations (Granta, 2023). Well-trained employees are better equipped to perform their roles effectively, leading to reduced errors and improved productivity (ibid). Training programs should focus on equipping employees with the necessary knowledge and skills to

utilize the new GIS mapping technology, optimize routes, and enhance communication protocols. By investing in employee development, MQGC can ensure that its workforce is proficient in utilizing the upgraded system, leading to improved operational efficiency and minimized errors resulting from inadequate training.

8.2 Proactive Risk Management

It involves identifying, assessing, and mitigating potential risks before they escalate into major issues (Smith & Merritt, 2020). By instilling a culture of proactive risk management, MQ Garbage Collection can anticipate and address challenges more effectively. Conducting comprehensive risk analysis and implementing mitigation strategies can help prevent service disruptions, equipment failures, and adverse weather conditions from impacting operations (Strauss, 2023). By taking proactive measures to manage risks, MQ Garbage Collection can maintain operational continuity, enhance reliability, and build trust with stakeholders.

8.3 Advanced Communication Tools

To address communication gaps identified in the current system, MQGC should integrate advanced communication tools into its operations. Implementing platforms such as Slack or similar messaging applications can facilitate real-time communication between drivers, supervisors, and management (Romford, 2023). Additionally, automated email alerts can notify stakeholders of important updates, service disruptions, or changes in collection schedules (Apollo, 2023). By establishing efficient communication channels, MQGC can improve coordination, enhance transparency, and promptly address customer inquiries or complaints.

8.4 Operational Efficiency Enhancements

Operational efficiency is crucial for the success of any organization. By prioritizing operational efficiency, MQ Garbage Collection can optimize its processes and resource allocation strategies. Utilizing GIS mapping technology for route planning and scheduling optimization can minimize driver fatigue, reduce vehicle wear and tear, and optimize fuel consumption (Woods, 2023). Furthermore, implementing automated task management systems can facilitate smoother coordination between drivers, maintenance crews, and back-end staff, reducing overhead costs and improving overall efficiency (Natasha, 2024). By enhancing operational efficiency, MQ Garbage Collection can improve service quality, reduce costs, and maintain a competitive edge in the waste management industry.

8.5 Continuous Improvement Initiatives

Continuous improvement is essential for staying competitive and adapting to changing market dynamics (Lynn, 2022). By fostering a culture of constant improvement, MQ Garbage Collection can continually enhance its processes and services. Regular performance monitoring, data analysis, and stakeholder feedback mechanisms can provide valuable insights into areas for improvement (Intelogos, 2024). By acting on this feedback and continually refining its operations, MQ Garbage Collection can remain agile, responsive, and customer-focused, ensuring long-term success and sustainability in the waste management industry.

8.6 Automated Efficiency and Financial Management

Efficient and accurate reporting is crucial for informed decision-making and financial management (Zielinko, 2024). By streamlining efficient reporting and financial generation processes with modern technology and streamlined processes, MQ Garbage Collection can improve operational visibility and financial performance. Implementing integrated data management systems and automated reporting tools can enhance the accuracy and timeliness of reports, providing stakeholders with actionable insights into operational metrics and financial performance (Calzon, 2023). By leveraging technology to automate efficiency and financial management processes, MQ Garbage Collection can optimize resource allocation, reduce costs, and drive overall efficiency and profitability.

9. REFERENCES

Abdi, N. (2024) A step-by-step guide to calculating the exact cost of turnover [free calculator], Sparkbay. Available at: https://sparkbay.com/en/culture-blog/calculate-cost-turnover-3#:~ (Accessed: 11 May 2024).

Apollo (2023) How an email alert system can build healthy team communication, Apollo Technical LLC. Available at: https://www.apollotechnical.com/how-an-email-alert-system-can-build-healthy-team-communication/ (Accessed: 10 May 2024).

Calzon, B. (2023) Automated Reporting Systems & Tools for Quality Reports, datapine. Available at: https://www.datapine.com/blog/automated-reporting-system-and-tools/ (Accessed: 10 May 2024).

Cordano, D. (2024) Car service costs in 2024, Oneflare. Available at: https://www.oneflare.com.au/costs/car-service (Accessed: 11 May 2024).

Eby, K. (2023) Project Success Criteria Guide, Smartsheet. Available at: https://www.smartsheet.com/content/project-success-criteria#:~:text=and%20quality%20constraints.-,What%20Are%20the%20Main%20Success%20Criteria%20for%20Projects%3F,also%20vital%20project%20criteria%20categories. (Accessed: 14 May 2024).

Granta (2023) How does employee training and Development Improve Operational Efficiency: Granta automation, Granta Automation | Automated Palletising Solutions. Available at: https://www.granta-automation.co.uk/news/how-does-employee-training-and-development-improve-operational-efficiency/ (Accessed: 10 May 2024).

IBM (2023) Cost of a data breach 2023, IBM. Available at: https://www.ibm.com/reports/data-breach (Accessed: 11 May 2024).

Intelogos (2024) How can data analytics improve the measurement of employees' performance?, Intelogos. Available at: https://www.intelogos.com/blog-post/how-can-data-analytics-improve-the-measurement-of-employees-performance (Accessed: 10 May 2024).

Lewis, P., Richardson, A. and Corliss, M. (2022) Compliance costs of regulation for small business. Available at: https://vulj.vu.edu.au/index.php/jbsge/article/download/715/886?inline=1 (Accessed: 11 May 2024).

Lynn, R. (2022) The importance of continuous improvement, Planview. Available at: https://www.planview.com/resources/articles/lkdc-importance-continuous-improvement/ (Accessed: 10 May 2024).

Mawhinney, J. (2022) What is a KPI? how to choose the best Kpis for your business, HubSpot Blog. Available at: https://blog.hubspot.com/marketing/choosing-kpis (Accessed: 14 May 2024).

Natasha (2024) How automation can drive workforce efficiency, Time Doctor Blog. Available at: https://www.timedoctor.com/blog/automation-in-the-workplace/ (Accessed: 10 May 2024).

NewVoiceMedia (2018) NewVoiceMedia research reveals bad customer experiences cost U.S. businesses $75 billion a year, NewVoiceMedia Research Reveals Bad Customer Experiences Cost U.S. Businesses $75 Billion a Year | Business Wire. Available at: https://www.businesswire.com/news/home/20180517005043/en/NewVoiceMedia-Research-Reveals-Bad-Customer-Experiences-Cost-U.S.-Businesses-75-Billion-a-Year (Accessed: 11 May 2024).

Romford, J. (2023) What are the digital applications that focus on workplace communications?, AgilityPortal. Available at: https://agilityportal.io/blog/what-are-the-digital-applications-that-focus-on-workplace-communications (Accessed: 10 May 2024).

Skidmore, A.K. et al. (1996) 'An operational GIS expert system for mapping forest soils', Photogrammetric Engineering and Remote Sensing, 62(5), pp. 501–511.

Smith, P.G. and Merritt, G.M. (2020) Proactive risk management [Preprint]. doi:10.4324/9780367807542.

Strauss, L. (2023) Effectively conducting a risk assessment, Thought Leadership & Blogs. Available at: https://blog.6clicks.com/effectively-conducting-a-risk-assessment (Accessed: 10 May 2024).

Tully, M. (2023) How to make accurate project assumptions: A complete guide, Rodeo Software B.V. Available at: https://www.getrodeo.io/blog/project-assumptions (Accessed: 14 May 2024).

Usmani, F. (2024) Expected monetary value (EMV): A guide with examples, PM Study Circle. Available at: https://pmstudycircle.com/expected-monetary-value-emv/ (Accessed: 09 May 2024).

Venn (2023) How much do integrations cost (and is it worth it)?, Venn Technology. Available at: https://venntechnology.com/blog/how-much-do-integrations-cost-and-is-it-worth-it (Accessed: 11 May 2024).

Woods, C. (2023) 5 benefits of using route planning software, Locate2u. Available at: https://www.locate2u.com/route-planning/5-benefits-of-using-route-planning-software/ (Accessed: 10 May 2024).

Zielinko, C. (2024) Why Accurate Financial Reporting Matters for every business, Numeral. Available at: https://gonumeral.com/why-accurate-financial-reporting-matters-for-every-business/ (Accessed: 10 May 2024).