



ESTABLISHING OF NEW AUTOMATED PRODUCTION LINE

Faculty of Project Management - SOSE2024

Presentation Day:	12.06.2024
Project Sponsor:	Manuela Varsani
Project Manager:	Sai Dinesh Patnam
Project Team:	Satya Jathin Kamuju Balaji Pedada Tarun Chandra Mummareddy Geethika Sai Vara Priyanka Gudivada Mohammed Shahin Kadannampotta

Management Summary

The paper details the implementation of the Inductive Future project through the phases of the project management lifecycle: definition, initiation, planning, monitoring, and closing. The project's primary goal is to become the leading provider of innovative inductive technology and achieve a 45% market share by 2030. The project is structured into six departments: Legislation, Engineering, Marketing & Sales, Support & Contact, Finance, and Project Management. Activities are scheduled for parallel execution to enhance efficiency, resulting in a planned project duration of eighteen weeks.

Cost and resource planning encompass personnel and material costs, with a total budget of €250,000. Key stakeholders, including the project sponsor, client, and project team, were identified using stakeholder analysis and classified for close management. Consequently, a communication plan was devised.

Risk analysis highlighted three major risks: approval delays, technical installation issues (such as power supply problems), and cost increases due to material price fluctuations. Preventive and corrective measures were established to mitigate these risks.

As of June 26, 2024, project monitoring revealed a delay in the "Installation of Production Line and Optimizing Production Process" activity, causing the project to be behind schedule and over budget. The cost variance is -€1,200, and the schedule variance is €870, equating to roughly three working days. An Ishikawa diagram was employed to pinpoint the delay's root causes, identifying low employee motivation and payment issues in the site analysis team as primary factors. To address these problems, the project proposes enhancing employee intrinsic motivation, organizing team-building events, and adjusting wages.

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1. Project Description and Definition

1.1 Project background

Investing in establishing a fully automated filling production line is imperative for our organic shampoo company. With our product experiencing unprecedented success in the market, the surge in demand has left us struggling to keep up. Forecasts indicate even greater demand in the future. By prioritizing automation, we aim to significantly increase our production rate to meet these market demands effectively. This strategic move will enhance our production efficiency and agility, ensuring that we can fulfil customer orders promptly. With automation, we can scale our production capacity rapidly to meet growing demand without compromising on product quality. By investing in automation technology, we are positioning ourselves for continued success and market leadership in the organic shampoo industry. In summary, establishing an automated production line aligns with our goal of meeting market demands efficiently and maintaining our competitive edge.

1.2 Project Goal

This major investment initiative involves expanding our organic shampoo production capacity through a fully automated filling production line. By adopting this approach, we're investing in innovation and efficiency, positioning ourselves as industry leaders. In essence, this project is a significant investment for our company's future.

Specific	The goal is Specific, aiming to establish a fully automated production line for our shampoo product, which includes installing advanced machinery, optimizing the production process, and ensuring all staff are trained to operate the new system.
Measurable	The goal is Measurable, targeting a 50% increase in production capacity. This will be measured by comparing the output volume before and after the implementation of the new production line, using production data metrics.
Achievable	The goal is Achievable, leveraging existing technology and resources to implement the new production line. We will ensure the feasibility by conducting a detailed analysis of our current capabilities and identifying any gaps that need to be filled.
Realistic	The goal is Realistic, addressing the market demand for our shampoo product and aligning with our company's strategic growth objectives to expand market share and improve profitability. This project supports our long-term business goals.
Time	The goal is Time-bound, aiming to complete the project within six months from the start date. This timeline includes planning, procurement, installation, testing, and staff training, with key milestones set at each phase to ensure we stay on track.

Table 1 : SMART-The goals of the project

1.3 Environmental analysis

For further definition of the project, it is necessary to take the main influencing factors into account. External and internal factors are discussed and evaluated separately. The result is an overview of those stakeholders and other factors containing the strategy, the project team, the organizational structure, the acceptance for change, and tools and equipment that support this project.

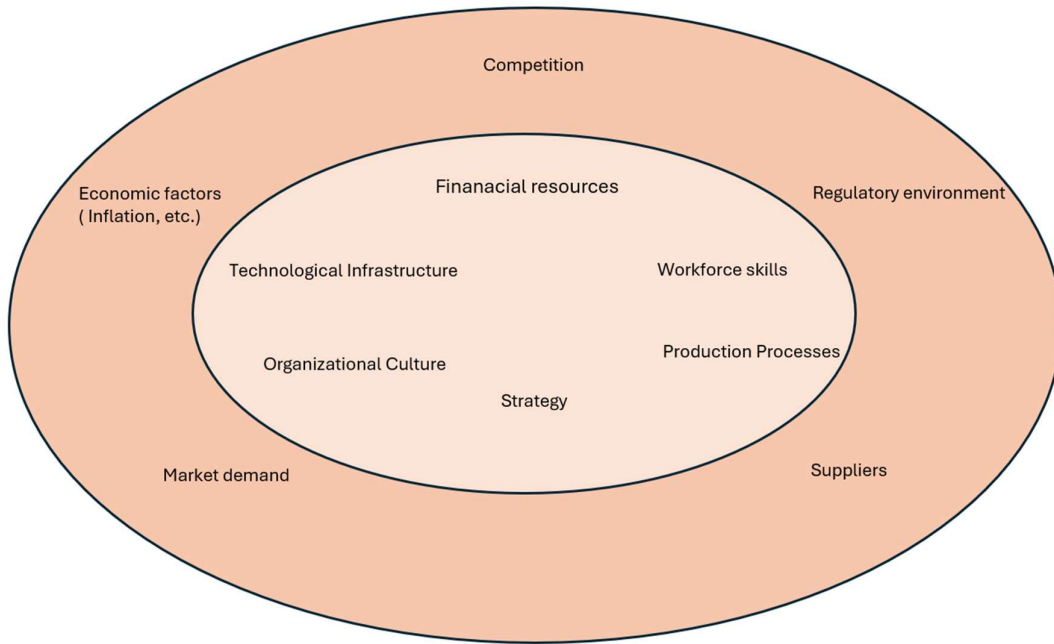


Figure 1: Main influencing factors

In addition to internal factors, there are external factors that can have a significant impact on this project. These include market demand, competition, regulatory environment, and economic conditions. Market demand plays a crucial role in determining the success of the project, as it influences the level of investment and the potential for growth. Competition from new entrants can also affect the project's viability, as it may lead to changes in market dynamics and customer preferences. Furthermore, supplier demands and regulations must be considered, as they can affect the availability of resources and compliance requirements. Changes in regulations, especially those related to environmental sustainability, may necessitate adjustments to project plans and timelines.

Moreover, extreme factors such as natural disasters or geopolitical events can have unforeseen impacts on the project, disrupting supply chains and causing delays or cost overruns. These external factors underscore the importance of carefully assessing and mitigating risks throughout the project lifecycle.

In summary, a thorough understanding of both internal and external factors is essential for effectively managing and implementing the project. By proactively addressing these factors and adapting to changing conditions, the project can achieve its objectives and deliver value to the organization.

Internal factors	Power (L/M/H)	Influence (L/M/H)	Measures
Financial resources	H	H	Ensuring the feasibility of the project to the stakeholders, or liquidation of shares may help in raising the funds for this project
Technological infrastructure	H	H	Selection of infrastructure for the production line, must be adaptable for the labour and easy to maintain and where quality is the priority.
Organisational culture	M	H	Adapting to new operations and machines would be difficult for the organisation, but training and induction programmes will be helpful.
Strategy	M	H	Planning and scheduling which includes review of project after every phase will ensure success.
Workforce skills	M	H	It will be a challenge to find new labour and training them with respect to company standards will cost time and money.
Production processes	M	M	Optimizing the production processes on new line will be a challenge, but with help of experts it will be maintained with continuous training

Table 2 : Environmental Analysis – Internal Factors

External factors	Power (L/M/H)	Influence (L/M/H)	Measures
Competition	H	H	Understanding the trends and impact of the competitors on the market and adapting new strategies will help us benefiting from this project
Regulatory environment	M	M	The regulatory environments which include labour laws, quality standard assigned by government must be taken care and must adhere to it.
Economic factors (Inflation, etc.)	L	M	The inflation rates and geopolitical issues may affect the project for that a buffer amount must be created to tackle these kinds of situations.
Market demand	M	H	As the market demand is high, to compensate the lack of inventory overtime work, or late shifts must be initiated until the new line of production is operational.
suppliers	M	H	Selection of good suppliers which adhere to our standards and are reasonable with the prices and comparing it with suppliers according to market standards.

Table 3: Environmental Analysis –External Factors

2. Project Initiation

2.1 Project Charter

Project Charter			
Project name:	Establishing of new automated production line	Project number:	P-001
Stakeholder:	Internal Stakeholders	Project lead:	Patnam Sai Dinesh
Date:	20/04/2024		
Project Description: <i>High-level description of project</i>			
Establishing of a new fully automated production line, to increase the production rate to 30000 units to meet the market demands.			
<input checked="" type="checkbox"/> Investment	<input type="checkbox"/> sustainable	<i>Please describe why.</i>	
It will be an investment project, as the market is growing, to meets its demands the capacity of production must be increased, so that we don't loose our hold in the market due to lack of inventory.			
Business need: <i>Reason for the project, external, internal (strategically intention)?</i>			
Due to demand of our product has gained a significant growth, the present manual production line is lagging to meet the market demands, for that a new fully automated production line must be established to meet the market requirements.			
Project Goal: <i>SMART</i>			
Establishing a new automated production line to increase our production rate by 50% by quarter 3 of this year that is by 08.08.2024.			
Requirements: <i>High-level list</i>			
Requirements: Increase the production rate by 50% to meet the market demands. Deliverables: Establishing a new production line with 10000 units rate of production.			
Organisation:			
Project Sponsor:	Manuela Varsani		
Steering Committee:	Satya and Pedada Balaji, Geethika Sai Vara Priyanka, Mohammed Shahin		
Project lead:	Patnam Sai Dinesh		
Project team:	Kamuju Satya Jathin, Tarun Chandra Mummareddy, Pedada Balaji, Gudivada Geethika Sai vara Priyanka, Kadannampotta Mohammed Shahin		
Schedule:			
Start Project:	04-04-2024		
Milestones:	<ul style="list-style-type: none"> - 20-04-2024: Planning and preparation and finishing of project charter - 14-05-2024: Design and procurement - 10-06-2024: Construction and Installation - 20-06-2024: Testing and training - 25-06-2024: Operational ramp-up - 28-06-2024: Full production and optimization and project closure 		
End of Project:	29-10-2024		
Resources: <i>High-level estimation</i>			
Project Budget:	250,000.00 €		
People:	<ul style="list-style-type: none"> • Sai Dinesh, Tarun Satya Jathin 20% 	<ul style="list-style-type: none"> • Shahin, Geethika 55% 	<ul style="list-style-type: none"> • Sathy Jathin, Balaji 25%
Other:	Tools, Power supply, cables, Metal frames, conveyer belts, Manpower, sensors, processing systems (PLC's).		

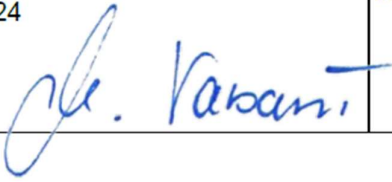

Project Risks: <i>High-level list (Basis for Risk-Analysis)</i>	
Internal Risks: financial resources, Infrastructure, workforces skills, culture. External risks: Suppliers, competition, economic factors, market demand.	
Justification: <i>(2-3 sentences, result of your Feasibility Study/Cost-Benefit-Analysis/SWOT-Analysis)</i>	
The project's cost benefit analysis shows' favorable return of investment to the company, with long term benefits expected to increase the production rate by 50%, to meet the market demands and potential expenditure for the new production would be a great opportunity for market penetration and expansion.	
Attached Documents: (List all attached documents)	
Environmental Analysis, Cost-Benefit Analysis	
Project Sponsor:	Project Lead:
Date and Signature 20.4.2024 	Date and Signature 20/04/2024 

Table 4: Project charter

2.2 Justification: Cost benefit analysis

By using cost benefit analysis, we have calculated the cost and benefits from the investments made throughout the project, which gives an overview of the division of investments into different categories,

Category	Cost (€)	Benefits (€)	Evaluation
Initial Investment Costs	€200,000	-	Initial investment costs include equipment purchase, installation, and technology upgrades. These costs are necessary to set up the partially automated production line.
Operational Costs (Per Year)	€35,000	-	Operational costs consist of maintenance, energy consumption, and additional staffing. These ongoing expenses ensure the smooth operation of the production line
Training Costs	€15,000	-	Training costs cover staff training programs required to operate and maintain the partially automated production line efficiently.
Increased Production Capacity		Increased Production Capacity	Increased production capacity leads to additional revenue generation due to higher output of shampoo products, meeting market demand more effectively.
Improved Product Quality		€2,500	Improved product quality reduces returns and complaints, enhancing customer satisfaction and brand reputation, resulting in increased sales.
Long-Term Cost Savings		€5,000	Long-term cost savings result from reduced labor costs and increased efficiency over time, leading to improved

			profitability and sustainability.
Competitive Advantage		Qualitative	The project provides a competitive advantage by positioning the company as technologically advanced, reliable, and capable of meeting market demand promptly, thus attracting more customers and increasing market share.
Scalability		Qualitative	The project enhances scalability by providing a foundation for future expansion and growth, allowing the company to adapt to changing market conditions and customer needs more effectively.
Total Costs (2 years)	€250,000		The total costs over two years include initial investment, annual operational costs, and training expenses required for the project.
Total Benefits (2 years)		€107,500	The total benefits over two years include increased production capacity, improved product quality, and long-term cost savings, resulting in additional revenue and improved brand reputation.
Net Benefit (2 years)		€107,500	The net benefit over two years is positive, indicating that the project is financially beneficial and strategically advantageous for the company.

Table 5: Cost and benefit analysis

After conducting a thorough cost-benefit analysis, our team has determined that the investment in establishing a partially automated production line for our shampoo product is financially viable and strategically beneficial for our company. Over a two-year period, the project incurs initial investment and operational costs totalling €250,000. However, the benefits derived from increased production capacity, improved product quality, and long-term cost savings amount to €107,500, resulting in a positive net benefit. This analysis demonstrates that the project not only enhances our competitiveness in the market but also contributes to our long-term growth and sustainability. Therefore, as a team, we recommend proceeding with the project as it aligns with our company's objectives and offers promising returns on investment.

3. Project Planning

3.1 Organizational plan

Glow Cosmetic Company stands as a beacon of innovation in the cosmetics industry, committed to excellence in product quality and manufacturing processes. Guided by the leadership of Patnam Sai Dinesh, our team embarks on an exciting journey to elevate our production capabilities. Supported by our esteemed sponsor, Manuela Varsani, our diverse team, comprised of skilled engineers, finance experts, and distribution specialists, prepares to introduce a new production line. As we anticipate the burgeoning demands of the market, we recognize the pivotal role played by our stakeholders. From loyal customers to strategic partners and local authorities, each stakeholder contributes to our collective success. In this comprehensive handbook, we delve into the intricate dynamics of stakeholder engagement, offering a detailed evaluation and strategic communication plan tailored to nurture enduring and mutually beneficial relationships. Through transparent and effective communication, we aim to foster trust, collaboration, and shared success in every aspect of our operations.

3.2 Work Breakdown Structure

To gain a better overview of the various tasks to be managed during the project phase, we developed a comprehensive work breakdown structure (WBS), as shown in Figure 2. We opted for a function-oriented WBS, identifying six key categories: project management, procurement, engineering, finance, installation, and optimizing & training. This structured approach allows us to organize and coordinate tasks efficiently, ensuring that all critical aspects of establishing the new production line are addressed systematically to meet our market demands.

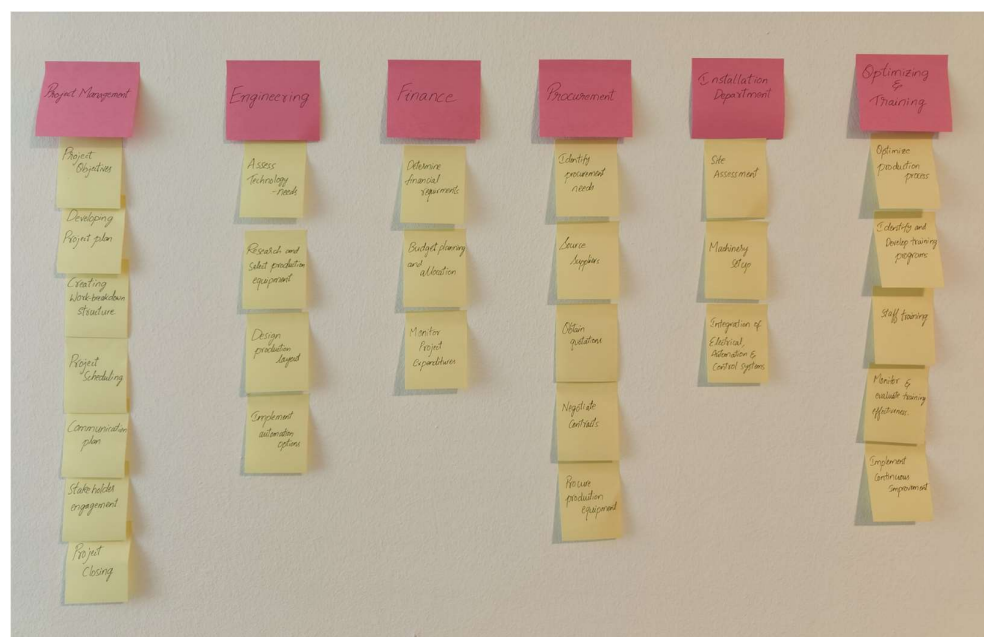


Figure 2 : Work break down structure

Project management includes tasks related to stakeholder engagement, planning, scheduling, and overall project coordination, ensuring that the project stays on track and meets its objectives. Procurement focuses on sourcing and obtaining necessary equipment, materials, and services required for the production line, ensuring timely and cost-effective acquisitions. Engineering handles the assessment, design, and implementation of the technological and engineering aspects, ensuring the production line meets technical specifications and operational standards. Finance manages budgeting, cost control, financial planning, and risk assessments, ensuring the project's financial health and sustainability. The installation category oversees the setup, installation, and initial testing of the new production line equipment, ensuring everything is correctly installed and functioning. Lastly, optimizing & training addresses continuous improvement of processes and provides training for staff, ensuring they are well-equipped to operate the new production line efficiently and effectively.

3.3 Schedule ad milestone plan

3.3.1 PERT

The Program Evaluation and Review Technique (PERT) is a valuable project management tool used to estimate the time required to complete a project. It achieves this by analysing three distinct time estimates for each task within the project: optimistic, realistic, and pessimistic.

- **Optimistic Time (to):** This represents the most optimistic scenario, where everything proceeds perfectly and there are no unexpected delays or obstacles. It reflects the shortest possible time for task completion.
- **Realistic Time (tr):** This estimate is based on a more grounded assessment, considering current knowledge, experience, and potential challenges. It represents the most likely duration for completing the task.
- **Pessimistic Time (tp):** On the opposite end of the spectrum, the pessimistic time estimate represents the worst-case scenario, factoring in unexpected delays, complications, or setbacks. It indicates the longest possible duration for task completion.

Using these three-time estimates, PERT calculates a weighted average, known as the most likely time or estimated time (TE), for each task. The TE provides a balanced estimation of task duration, considering both optimistic and pessimistic scenarios.

By leveraging PERT, project managers gain insights into the variability and potential risks associated with task durations. This allows for more informed decision-making in project planning, resource allocation, and scheduling. Additionally, PERT aids in identifying critical tasks, optimizing project timelines, and ultimately ensuring successful project completion within expected timeframes.

$$T_e = \frac{t_o + 4 * t_r + t_p}{6}$$

$$T_e = \frac{(10+4 \times 15+)}{6} \approx 14.67W$$

t_o	=	time
t_r	=	time
t_p	=	time

3.3.2 Network Diagram

Once the project has been broken down into individual work packages (cf. Figure 2), these will be placed in the correct order below. Figure 3 shows the network diagram of our project. The numbers of the individual tasks are based on the task numbers in the Gantt chart (cf. Figure 4). The critical path (shown as a red arrow in the diagram) indicates the shortest possible duration of the project. If there is a delay along this path, the whole project will be delayed. As currently planned, the project will take 18 weeks, or 132 business days, to complete. The length of the critical path could be reduced by parallelizing the activities and planning the resources to be optimized. The engineering department will play a decisive role in the duration of the project. This is also where the project team sees the greatest challenges in meeting all the scheduled targets.

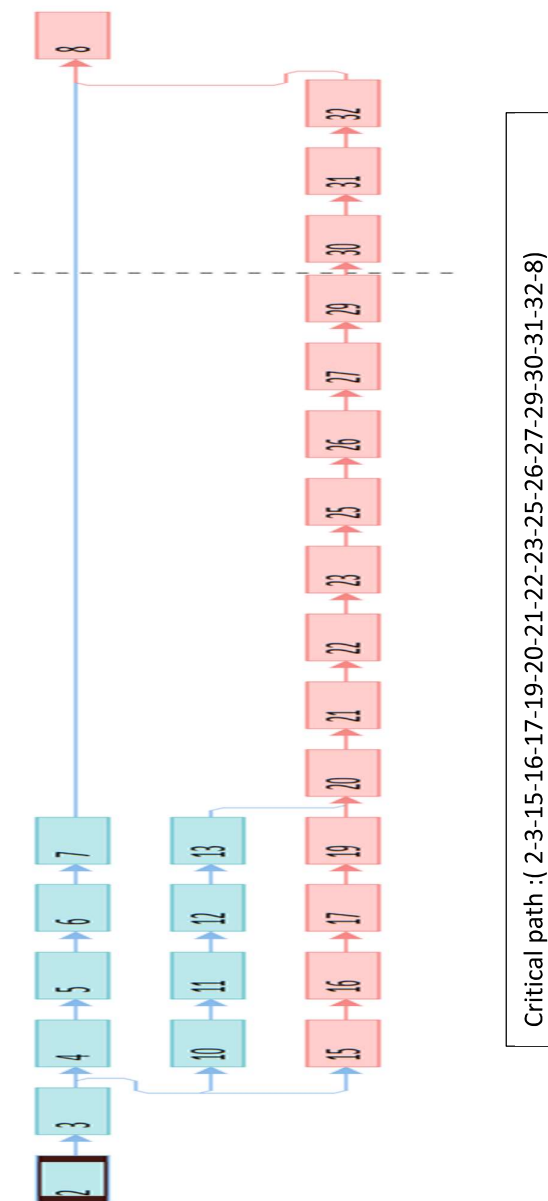


Figure 3: : Network diagram from Ms Project

3.3.3 Gantt Chart

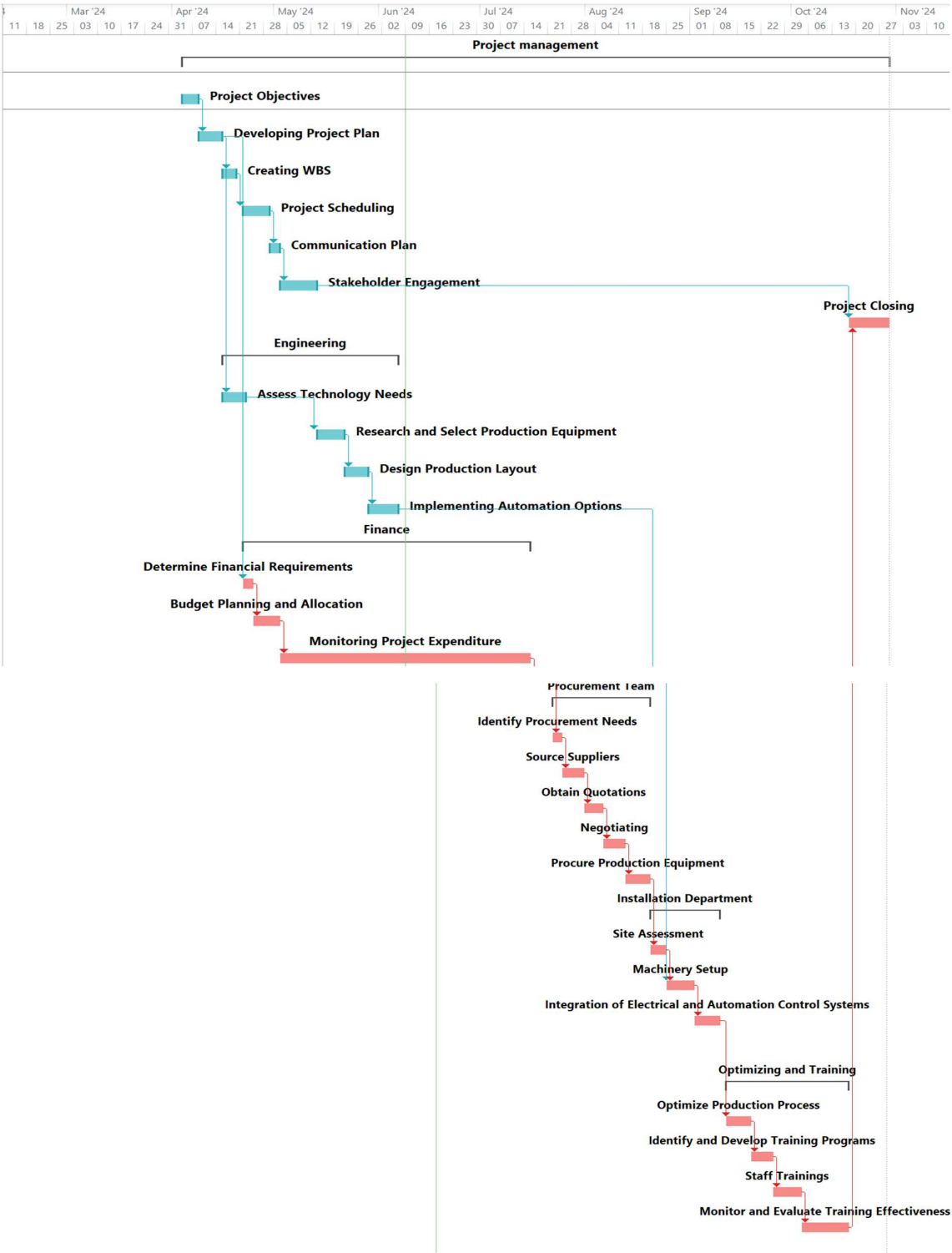


Figure 4 : Gantt Chart

3.4 Cost and Resource Planning

The cost and resource planning for our project are elucidated through various figures and tables. Figure 5 delineates the working hours allocated to individual project employees. Tables 5 and 6 offer a more granular breakdown of personnel and material costs, respectively. The allocation of working hours to employees stems from the project planning conducted within the Gantt Chart framework. Careful consideration was given to ensure that resources were allocated appropriately to each activity, thereby mitigating the risk of resource overload.

Team Member	Category	Hourly Pay Rate (€)	Total Earnings (€)	Hours Available
Sai Dinesh	Project Manager	30	6,000	200
Satya Jathin	Engineering	25	6,000	240
Geethika	Engineering	20	4,800	240
Shahin	Finance	30	3,000	100
Tarun Chandra	Procurement	25	3,000	120
Balaji	Installation	25	6,000	240

Table 6: Breakdown of Personnel cost

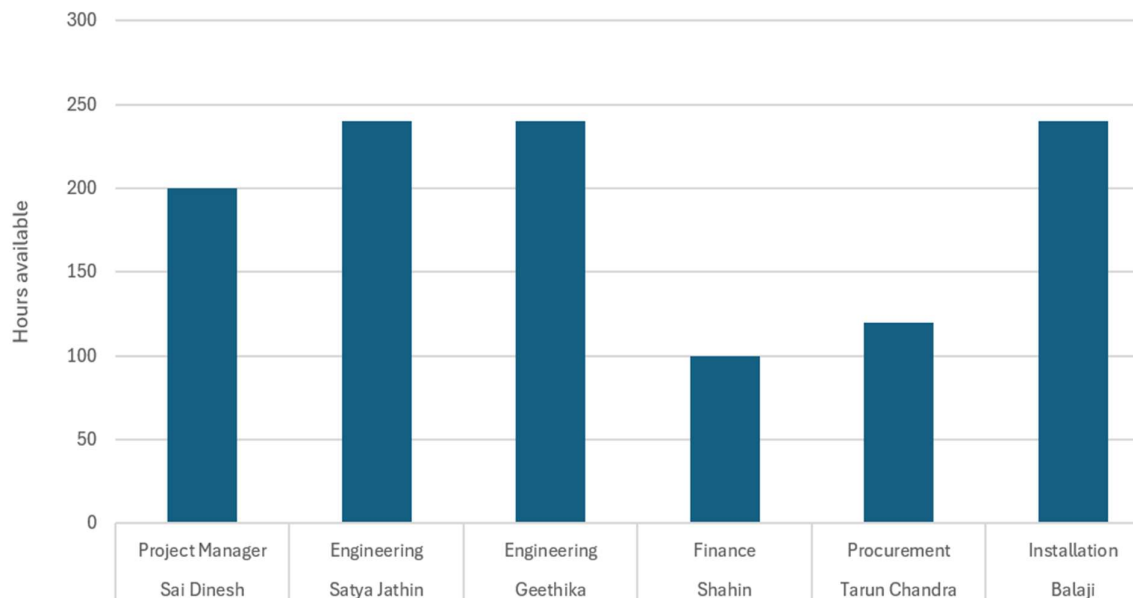


Figure 5 : Planned working hours of the project

Sl.no	Category	Allocated Budget (€)
1.	Machinery and Equipment	1,50,000
2.	Tools and Instruments	30,000
3.	Infrastructure and Facilities	20,000
4.	Software and Technology	20,000
5.	Training and Documentation	20,000
Total		2,40,000

Table 7: Breakdown of material cost

The composition of the project costs can be derived from Figure 6. Here, the biggest part of the total costs is mainly for materials, which require a budget of 190,000€. Additionally, the project manager incurs personnel costs of 16,000€. These costs encompass the planning, coordination, and supervision of project activities, ensuring smooth execution and timely delivery.

Summarizing the personnel and material costs, a total budget of 206,000€ is required. This budget allocation reflects the strategic distribution of resources to meet project objectives while maintaining cost efficiency and quality standards.

The cumulated costs along the project's duration are shown in Figure 7, providing a visual representation of expenditure trends over time. This dynamic visualization aids in monitoring project spending, identifying potential deviations from the budget, and making informed decisions to optimize resource utilization.

By aligning project costs with strategic objectives and utilizing resources effectively, we aim to achieve project success within the allocated budget and timeframe, delivering value to stakeholders and ensuring the project's long-term sustainability

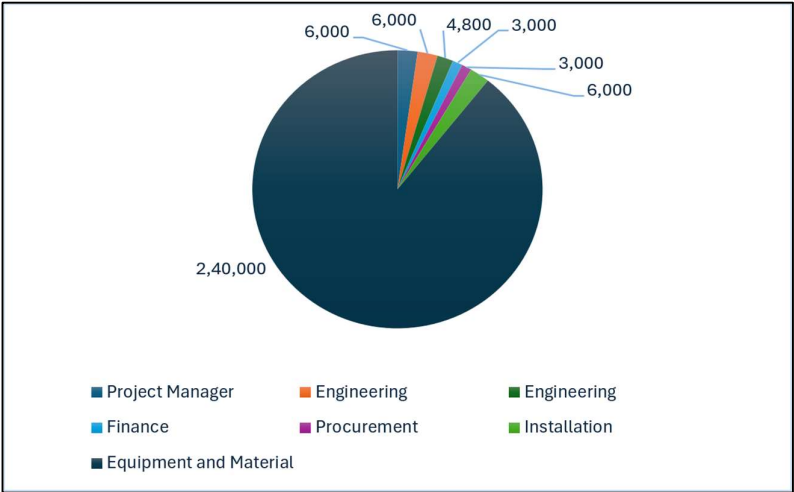


Figure 6: Planned resource costs of the project

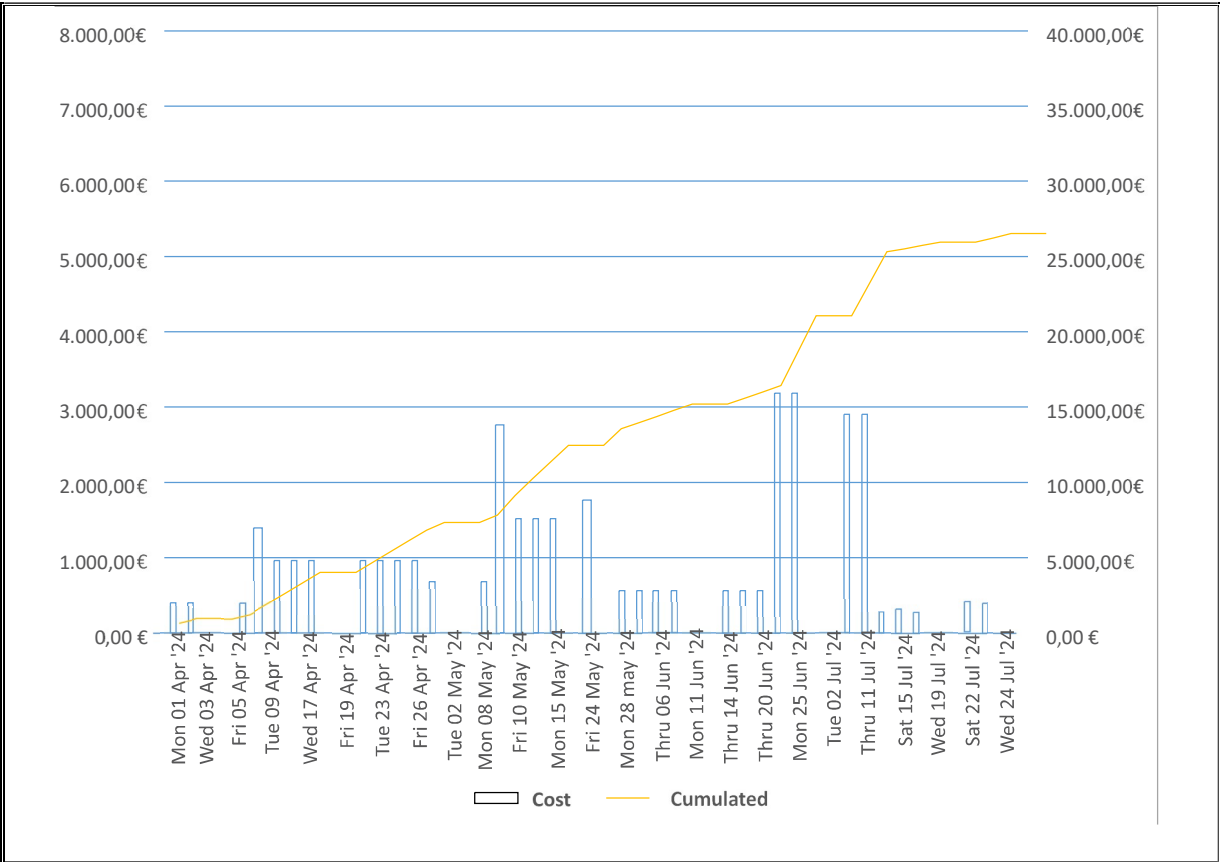


Figure 7 : Cost Base Line

3.5 Stakeholder Management

3.5.1 Stakeholder Analysis

A major task during a project is the satisfaction of any stakeholder by fulfilling their interests and keeping them updated. By performing a stakeholder analysis (Table 7), we determined all relevant stakeholders and clustered them into action. Resulting from our analysis we established our sponsor, customer and the project team as the most significant stakeholders that need to be managed very closely.

Stakeholders	Goals and Interests	Influence	Interest	Action	Strategy
Sponsor	Increase company profitability; Ensure project aligns goals and budget	High	High	Support and approval	Regular updates on project progress; Highlight project benefits
Production Manager	Improve production efficiency; Minimize disruption to operations	High	Medium	Support and cooperation	Provide project updates; Address concerns promptly
Finance Director	Control project costs; Ensure project delivers ROI	Medium	High	Monitor and approve budget	Provide financial data and forecasts; Highlight cost-saving measures
Suppliers	Timely delivery of materials; Maintain positive business relationship	Medium	High	Fulfill contractual obligations	Communicate project requirements; Address any issues promptly
Regulatory Authorities	Compliance with regulations; Ensure project meets legal requirements	High	Medium	Monitor and enforce regulations	Provide necessary permits and approvals; Engage in regular communication
Local Community	Minimize environmental impact; Avoid disruption to community	Medium	Medium	Provide feedback and support	Engage in community outreach; Address concerns and provide updates
Project Team	Successfully execute project tasks; Meet project deadlines and objectives	High	High	Contribute to project execution	Regular team meetings; Provide necessary resources and support

Table 8: Stakeholder Analysis

3.5.2 Communication Plan

To gain an understanding of the stakeholders and participants involved in our project and their respective interests, we have developed the following chapter. This section aims to identify relevant information, project phase, communication channel, and frequency for each party (refer to Table 8). Upon analysis, it became apparent that certain stakeholders, particularly internal project members like the project team and our sponsor, require more frequent updates.

Stakeholders	Information	Phase	Communication Channel	Frequency
Sponsor	Project progress updates; Key milestones and achievements	All phases	Email; In-person meetings	Weekly progress reports
Production Manager	Production schedule changes; Resource allocation updates	Execution	Project management software	As needed
Finance Director	Budget status; Financial forecasts; Cost-saving measures	Planning	Email; Monthly meetings	Monthly financial reports
Suppliers	Order specifications; Delivery schedules; Quality requirements	Procurement	Email; Phone calls	As needed
Regulatory Authorities	Permit and approval requirements; Compliance updates	Initiation	Regulatory portals; Meetings	As required
Local Community	Project updates; Community outreach initiatives	Execution	Public meetings; Newsletters	Bi-monthly updates
Project Team	Task assignments; Project deadlines; Team progress	All phases	Project management software; Meetings	Weekly team meetings

Table 9: Communication plan of the project

3.6 Risk Management

During our project to establish a fully automated production line in our shampoo company, we anticipate encountering various risks that could significantly impact our ability to achieve our project goals. To address these risks, we conducted a comprehensive risk analysis to assess the probability of occurrence, the potential impact, and the resulting priority of each risk (cf. Table 9).

Based on our analysis, we have identified six major risks that require careful evaluation in the next step. The most critical and relevant risks identified in our analysis are:

1. **Delays Due to Missing Approvals:** Obtaining necessary regulatory approvals and permits may pose a significant challenge and could lead to delays in project timelines.
2. **Technical Problems:** Given the complexity of implementing a fully automated production line, technical issues such as equipment malfunctions or integration challenges could arise, potentially impacting project progress.

3. **Rising Costs Due to Material Prices:** Fluctuations in material prices could result in unexpected cost increases, potentially exceeding our project budget and affecting financial viability.

To mitigate these risks, we have defined a set of corrective and preventive measures aimed at avoiding or addressing these challenges. These measures include:

- Proactively engaging with regulatory authorities to expedite approval processes and minimize delays.
- Implementing rigorous testing and quality assurance protocols to identify and address technical issues early in the project lifecycle.
- Establishing strategic partnerships with suppliers and monitoring market trends to mitigate the impact of fluctuating material prices.

By proactively addressing these critical risks and implementing effective risk mitigation strategies, we aim to safeguard the successful implementation of our project and ensure the achievement of our objectives.

Risk	Milestone/Phase	Probability	Impact	Priority	Preventive Measures	Corrective Measures
Delays Due to Missing Approvals	Regulatory Approval	High	High	High	Engage early with regulatory authorities; Establish clear communication channels	Expedite approval processes through regular follow-ups; Identify alternative approval paths
Technical Problems	Equipment Installation	Medium	High	High	Conduct thorough equipment testing; Ensure comprehensive training for staff	Implement rapid response protocols for technical issues; Seek external technical expertise as needed
Rising Costs Due to Material Prices	Procurement	Medium	Medium	Medium	Establish long-term contracts with suppliers; Monitor market trends regularly	Implement cost-saving measures; Renegotiate contracts with suppliers if necessary
Supply Chain Disruption	Material Procurement	Medium	High	High	Diversify supplier base; Develop contingency plans for alternative sourcing	Implement emergency procurement protocols; Explore secondary suppliers
Labor Shortage	Hiring and Training	Low	High	Medium	Implement proactive recruitment strategies; Invest in employee training and retention programs	Hire temporary workers; Reallocate resources to critical tasks
Equipment Failure	Production Operations	Low	High	Medium	Implement regular maintenance schedules; Invest in quality equipment	Develop backup plans for equipment failures; Establish maintenance contracts with suppliers

Table 10: Risk Analysis

3.7 Change control Management

In our change control management process for establishing a fully automated production line in our shampoo company, we ensure that any proposed changes are thoroughly evaluated and managed to minimize disruptions to the project. The process follows these steps:

1. **Change Request:** The process begins with a formal request for change, which can come from any project stakeholder or team member.
2. **Relevance Check:** The change request is first checked for relevance to the project objectives and requirements. If the check determines that the request is not relevant, it is rejected.
3. **Impact Assessment:** Relevant change requests are further assessed by the project manager to determine their impact on the project. If the estimated impact is less than 7,000€, the project manager has the authority to approve the request.
4. **Project Sponsor Approval:** If the estimated impact exceeds 7,000€ but is less than or equal to 25,000€, approval from the project sponsor is required. The project sponsor evaluates the proposed change and makes a decision regarding its approval or rejection.
5. **Board of Directors Review:** For change requests with an estimated impact exceeding 25,000€, a review and approval by the Board of Directors is necessary. The Board evaluates the change request and its potential effects on the project before making a decision.
6. **Documentation:** Throughout the process, all decisions and their effects are thoroughly documented to maintain transparency and accountability.
7. **Approval Decision:** The selected authority (project manager, project sponsor, or Board of Directors) makes a final decision on the approval or rejection of the change request based on the assessment of its relevance and impact.
8. **Project Plan Update:** If the change request is approved, the project plan is updated to reflect the proposed changes, including any adjustments to the schedule, budget, or scope.
9. **Implementation and Management:** Following approval, the proposed changes are implemented and managed according to the updated project plan.

This change control management process ensures that all proposed changes are carefully evaluated and managed to minimize risks and maintain project integrity. The process is illustrated in Figure 8.

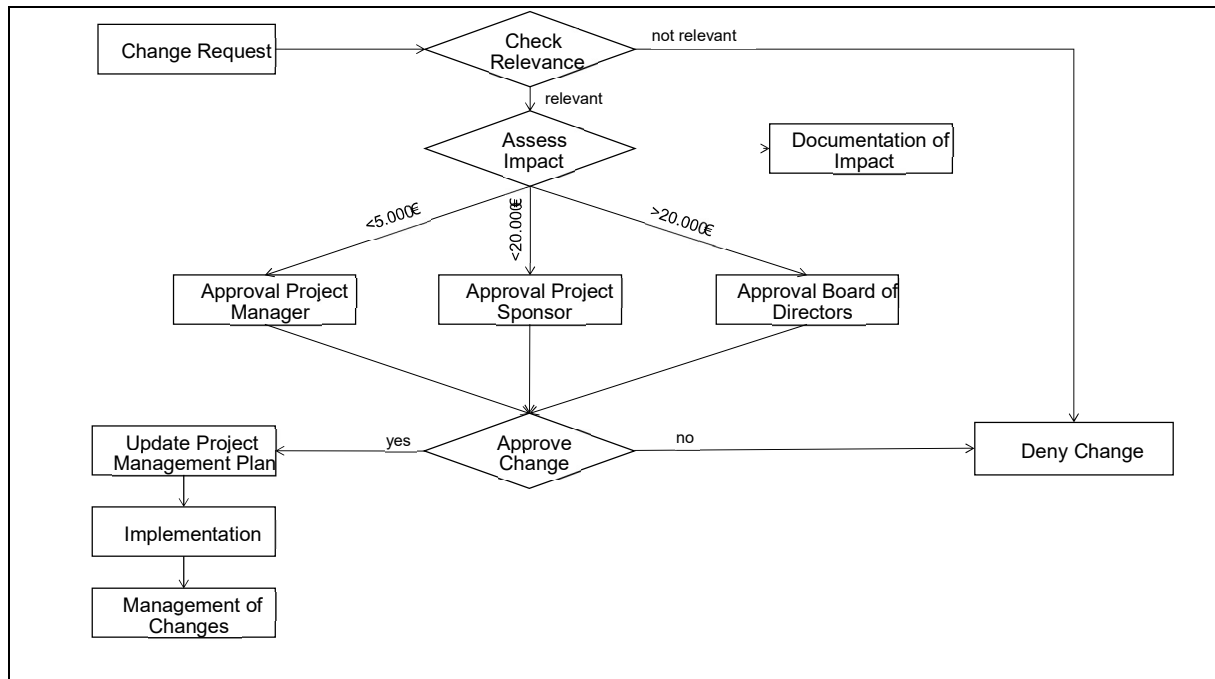


Figure 8 : Strategic Initiatives and Implementations Related to Inductive Charging Technology.

4 Project Monitoring

The following chapter deals with project monitoring. The project team reviews the progress of the project as of 26.06.2024. Various methods will be used to determine whether the project is on time and on budget.

4.1 0% / 50% / 100% Method (Status 26.06.2024)

The 0-50-100% method provides a concise snapshot of the project's current progress and earned value. This method evaluates each task to determine its status: not started (0%), in progress (50%), or completed (100%). Additionally, it compares the actual costs incurred with the planned costs and the earned value. This summary is illustrated in Table 10. Red cells highlight activities experiencing delays, while green cells indicate tasks that have been completed or commenced ahead of schedule.

Activity	Budget (in €)	Planned Progress	Actual Progress	Planned Costs (in €)	Earned Value (in €)	Actual Costs (in €)	Schedule Variance (SV) (in €)
PROJECT MANAGEMENT							
Creating Project Objective	2,000	100%	100%	2,000	2,000	2,000	0
Developing Plan	4,000	75%	75%	3,000	3,000	3,000	0
Creating a WBS	2,000	100%	100%	2,000	2,000	2,000	0
Scheduling	3,000	50%	75%	1,500	2,250	2,500	750
Communication Plan	3,000	50%	50%	1,500	1,500	1,500	0
Stakeholder Engagement	6,000	50%	50%	3,000	3,000	4,000	0
Total	20,000	70%	75%	14,000	15,000	15,000	1,000
ENGINEERING							
Assess Technology Needs	5,000	100%	100%	5,000	5,000	5,000	0
Research and Select Production Equipment	20,000	50%	50%	10,000	10,000	12,000	0
Design Production Layout	10,000	50%	50%	5,000	5,000	7,000	0
Implement Automation and Control Systems	65,000	50%	30%	40,000	30,000	31,000	-10,000
Total	1,00,000	60%	50%	60,000	50,000	55,000	-10,000
FINANCIAL MANAGEMENT							
Financial Requirements	10,000	75%	75%	7,500	7,500	7,000	0
Budget Planning	10,000	75%	50%	7,500	5,000	5,000	-2,500
Monitoring Expenditure	10,000	75%	50%	7,500	5,000	4,000	-2,500
Total	30,000	75%	60%	22,500	18,000	16,000	-4,500
PROCUREMENT							
Procurement Needs	10,000	75%	75%	7,500	7,500	6,000	0
Source Suppliers	15,000	70%	50%	10,500	7,500	8,000	-3,000
Obtain Quotations	10,000	50%	50%	5,000	5,000	5,500	0
Negotiation	15,000	50%	50%	7,500	7,500	9,000	0
Procure Production Equipment	20,000	50%	50%	10,000	10,000	11,500	0
Total	70,000	70%	50%	49,000	35,000	40,000	-14,000
INSTALLATION							
Site Assessment	5,000	100%	100%	5,000	5,000	4,500	0
Machinery Setup	10,000	50%	50%	5,000	5,000	5,500	0
Integration of Electrical & Automation	15,000	50%	50%	7,500	7,500	8,000	0
Optimize Production Process	10,000	50%	50%	5,000	5,000	5,500	0
Total	40,000	75%	75%	27,500	22,500	23,500	-5,000
TRAINING							
Develop Training Program	10,000	100%	100%	10,000	10,000	9,500	0
Training Staff	20,000	50%	50%	10,000	10,000	11,000	0
Evaluate Training Effectiveness	5,000	50%	50%	2,500	2,500	3,000	0
Total	35,000	67%	67%	22,500	22,500	23,500	0

Table 11: Cost overview

The project management phase, with a budget of 20,000€, is progressing well with 75% actual progress, slightly exceeding the planned progress of 70%. The engineering phase, with a budget of 100,000€, has reached 50% actual progress, falling short of the 60% planned progress. Financial management, with a budget of 30,000€, is facing challenges, achieving only 60% actual progress against the planned 75%. Procurement, with a budget of 70,000€, is lagging with 50% actual progress, compared to the planned 70%. The installation phase, with a budget of 40,000€, is on track, matching the planned 75% progress. Lastly, the training phase, with a budget of 35,000€, is progressing steadily with 67% actual progress. Overall, while some phases are meeting or exceeding expectations, others require closer attention to ensure alignment with the project timeline and budget constraints

4.2 Earned value Analysis (EVA) (Status 26.06.2024)

The 0-50-100% method enables the calculation of project status and meaningful metrics by utilizing earned value analysis (refer to Table 10). This analysis considers both cost and schedule variance during project monitoring. Furthermore, it facilitates the computation of performance indicators, aiding in estimating the budget and time at completion (forecast indicators).

Earned Value Analysis (EVA)

- **Budget at Completion (BAC):** 221,000€
- **Earned Value (EV):** 102,500€
- **Planned Value (PV):** 132,600€
- **Actual Cost (AC):** 115,500€

Key Performance Indicators

- **Schedule Variance (SV):** $EV - PV = 102,500€ - 132,600€ = -30,100€$
- **Cost Variance (CV):** $EV - AC = 102,500€ - 115,500€ = -13,000€$
- **Schedule Performance Index (SPI):** $EV / PV = 102,500€ / 132,600€ = 0.77$
- **Cost Performance Index (CPI):** $EV / AC = 102,500€ / 115,500€ = 0.89$

Forecast Indicators

- **Estimate at Completion (EAC):** $BAC / CPI = 221,000€ / 0.89 = 248,315€$
- **Estimate to Complete (ETC):** $EAC - AC = 248,315€ - 115,500€ = 132,815€$

The project currently shows a negative schedule variance, indicating it is behind schedule. The cost variance is also negative, suggesting that the project is over budget. The SPI and CPI values being less than 1 indicate inefficiencies in both schedule and cost management.

Forecast indicators suggest that if current trends continue, the project is likely to exceed the budget, with an estimated completion cost of 248,315€, which is higher than the initial budget of 250,000€. Corrective measures should be taken to address the schedule delays and cost overruns to bring the project back on track.

Data Overview		
Monitoring Time	tm (weeks)	13,7
Budget at Completion	BAC	221,000 €
Duration at Completion	DAC (weeks)	18
Planned Value	PV	132,600 €
Actual Costs	AC	115,500 €
Earned Value	EV	102,500 €
Variances		
Cost Variance	$CV = EV - AC$	- 13,000 €
Schedule Variance	$SV = EV - PV$	- 30,100 €
Performance Indicators		
Cost Performance Indicator	$CPI = EV / AC$	77%
Schedule Performance Indicator	$SPI = EV / PV$	89%
Forecast Indicators		
Estimated Budget at Completion	$EBAC = BAC / CPI$	2,48,315 €
Estimated Duration at Completion	$EDAC = DAC / SPI$	17,81

Table 12: Earned Value Calculation

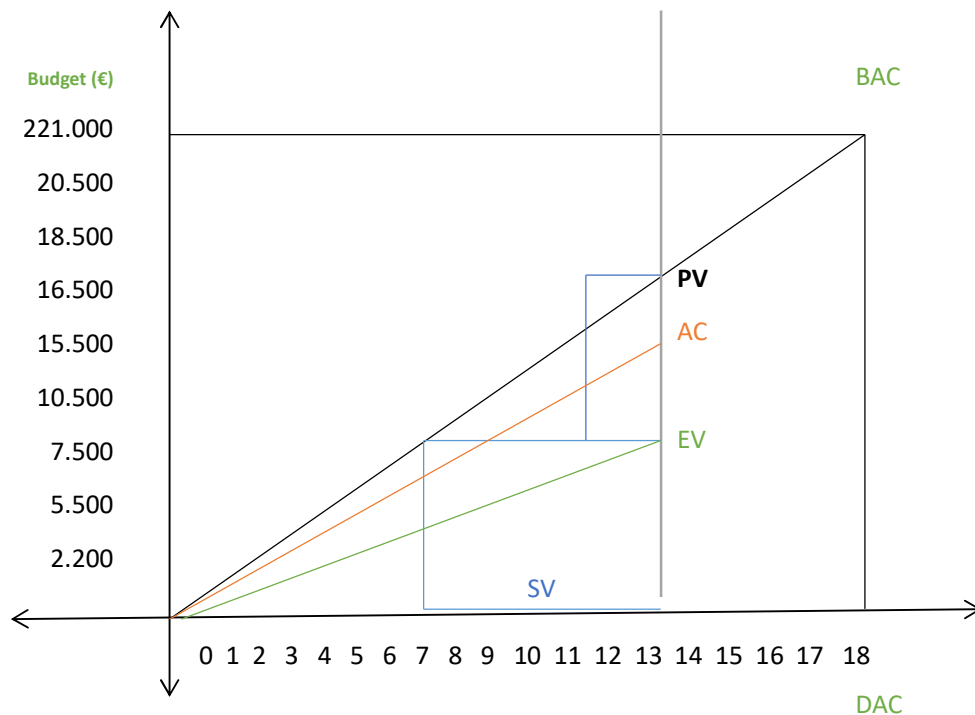


Figure 9: Earned Value Analysis (Graphic)

4.3 Route-cause Analysis (Ishikawa Diagram)

After conducting an in-depth analysis of our project progress through earned value assessment, it's evident that we're facing significant delays, particularly in our location analysis phase. To identify the root causes, we've utilized an Ishikawa diagram, examining various factors contributing to this issue. Through this analysis, we've identified market conditions and low wages as potential catalysts, particularly impacting our team dynamics.

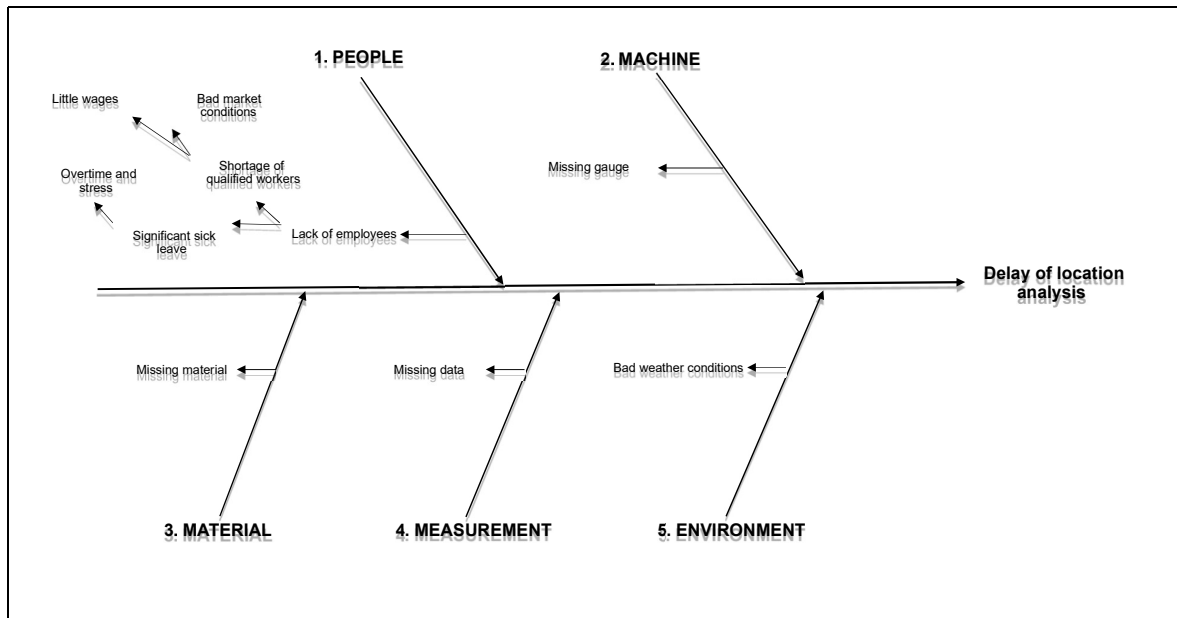


Figure 10 : Ishikawa Diagram

To address these challenges, we propose implementing measures aimed at enhancing employee satisfaction and motivation. This includes organizing team-building events and providing continuous training to foster intrinsic motivation among our staff. Additionally, developing a transparent salary structure with opportunities for advancement can incentivize our employees to strive for excellence.

5 Project Closing

Considering the projects achievements at the end, this chapter is meant to summarize all the initial information's and foundations that haven been planned to perform this project as successfully as possible. Therefor you can find a detailed report about all the necessary project details that were initially planned.

5.1 Background and Initial data:

At the culmination of our collective efforts, the project has triumphantly reached its objective of establishing a new production line, a significant milestone in our organizational journey. Here's a succinct overview of the foundational elements that paved the path for this achievement.

Initiated with the strategic vision of implementing a new production line, this project is a testament to our commitment to innovation and adaptability in response to evolving market demands. By embracing this initiative, we aim to enhance our manufacturing capabilities, ensuring our ability to meet the needs of our customers effectively.

Scheduled to commence on April 4th and conclude on October 29th, our project was entrusted with a budgetary allocation of €250,000, indicative of our firm commitment to the success and viability of this endeavour. Steering the project's course were essential stakeholders including the Sponsor, Production Manager, Project Team, Finance Team, and Engineering Team.

Identified as pivotal stakeholders for this project are both internal teams and external partners crucial to the seamless implementation of the new production line. Guided by a proficient project management team, our undertaking received support from professionals spanning diverse disciplines including IT, finance, engineering, and logistics, underscoring our collective dedication to achieving excellence in this venture.

5.2 Lessons learned

Reflecting on our journey through the various phases of our project, it's evident that we've gleaned valuable insights that have enriched our project management practices.

First and foremost, we've learned the paramount importance of maintaining robust communication channels. By upholding a constant flow of information, we can promptly assess task requirements and allocate resources effectively. While our team diligently adhered to regular meetings, we acknowledge room for improvement in structuring task approaches and information dissemination.

Furthermore, our analysis through the Ishikawa method highlighted the critical need to nurture both intrinsic and extrinsic motivation among our team members. Proactively safeguarding employee morale is essential to prevent project delays stemming from missed deadlines. Addressing this, we've implemented corrective actions, recognizing that bolstering internal staff motivation is integral to project success. Future initiatives will encompass organizing team-building events and adjusting construction staff salaries to mitigate this issue.

Lastly, we've realized the significance of timely problem communication. Swiftly addressing emerging issues with all relevant stakeholders enables proactive resolution and prevents escalation. Moving forward, we are committed to fostering an environment where challenges are promptly surfaced and addressed, facilitating the implementation of effective solutions before they escalate.

5.3 Technology Used

In leveraging MS Project software as our primary tool for project management, we've found it to be indispensable for maintaining clarity and organization across our diverse range of tasks and timelines. Its robust features have enabled us to not only schedule activities effectively but also to allocate resources efficiently, ensuring that project objectives are met within specified deadlines. Furthermore, the software's intuitive interface has simplified the process of creating and updating project plans, allowing for seamless adaptation to changing requirements or circumstances.

In tandem with MS Project, our utilization of a database has provided an invaluable means of communication and collaboration within our project teams. By centralizing work progress and results, the database has facilitated real-time access to critical information, fostering transparency and accountability among team members. This integration has not only streamlined workflow processes but has also served as a repository for valuable insights and lessons learned, contributing to continuous improvement and optimization of our project management practices.

5.4 Acceptance Criteria for the Deliverables

The Project has been completed successfully in the endeavour to establish a new automated production line; it is imperative to outline precise acceptance criteria for the deliverables. These criteria serve as essential benchmarks to evaluate the success and quality of the project outcomes comprehensively. They encompass various dimensions, including technical specifications, performance standards, operational requirements, regulatory compliance, and stakeholder validation.

Technical specifications form the foundation of the acceptance criteria, ensuring that the automated production line aligns with project objectives and industry standards. This involves meticulous consideration of compatibility with existing infrastructure, adherence to safety regulations, and seamless integration with relevant software systems. Additionally, the equipment and machinery must exhibit reliability, scalability, and ease of maintenance to support uninterrupted operation and future scalability.

5.5 Next Steps

Following the successful implementation of the "Establishing of New Automated Production Line" project for L'Oréal Group Cosmetics, our focus now shifts towards expanding our market presence to achieve a targeted market share of 45% by 2030. We will actively assess new project opportunities from potential partners such as supermarkets to leverage our automated production technology and widen our customer base.

Moving forward, we will conduct thorough market and location analyses to identify optimal deployment opportunities for our automated production line technology, enhancing our market reach and revenue streams. Additionally, we recognize the importance of engaging the public sector and will continue advertising efforts to showcase the benefits of our innovative technology, particularly within this sector.