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Improving visibility and ownership of new job orders at GPACK SPA

TESI DI LAUREA MAGISTRALE IN
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Abstract

The analysis focused on the new job order management process at the Vailate plant, in which the monitoring of the projects and their coordination relied significantly on informal practices and individual initiative. Lack of visibility in the process, fragmented information flow, and discontinuity in project ownership negatively impacted the overall controllability of the progress of the projects, leading to a reliance on reactive management. The objective of this thesis is to improve the visibility of the process, ensure continuity in ownership, and provide a more structured approach to project management.

To achieve this, the A3 problem-solving methodology was employed as a Lean thinking approach. This involved analysing the challenges through observation of the activities in the operation, conducting stakeholder interviews, and using value stream mapping techniques. Root cause analysis tools, such as the Ishikawa diagram, were employed to understand the structural causes that led to the lack of process visibility and ownership. This helped achieve a comprehensive understanding of the process and the design of appropriate countermeasures.

The countermeasures were centred on the improvement of monitoring practices, the enforcement of project ownership, and the improvement of coordination between the various functions. Structured monitoring mechanisms were implemented to facilitate the shared monitoring of the progress of the projects, along with the improvement of responsibility assignment. In addition, mechanisms were implemented to improve the integration of feedback and the initiation of the collection of technical knowledge, which formed the basis for the improvement of process management and the reuse of knowledge in the future.

The implementation of these enhancements gave substantial organizational benefits in terms of increased transparency in processes, ownership continuity, and the ability to coordinate functions. The process changed from being informal, experience-based, to a more defined process that was controllable and process maturity significantly improved in terms of visibility, ownership, and coordination. This was a step towards a more proactive project management.

Overall, the present thesis aims to prove the effectiveness of the application of Lean principles and A3 problem-solving methodology in the support of organizational improvement in a real-world scenario. This experience was beneficial to the strengthening of the structure of the process and to the development of more integrated project management practices.

Keywords: A3 problem solving, lean thinking, new job order management, process visibility, project ownership, process monitoring, process standardization, root cause analysis, value stream mapping, organizational alignment, continuous improvement, knowledge integration, industrial case study, process management, operational improvement.

Abstract in italiano

L'analisi si è concentrata sul processo di gestione delle nuove commesse presso lo stabilimento di Vailate, nel quale il monitoraggio dei progetti e il loro coordinamento si basavano in larga misura su pratiche informali e sull'iniziativa individuale. La mancanza di visibilità del processo, la frammentazione del flusso informativo e la discontinuità nella responsabilità dei progetti influenzavano negativamente la controllabilità complessiva dell'avanzamento dei progetti, determinando una gestione prevalentemente reattiva. L'obiettivo della presente tesi è migliorare la visibilità del processo, garantire la continuità della responsabilità e fornire un approccio più strutturato alla gestione dei progetti.

Per raggiungere tale obiettivo, è stata adottata la metodologia di problem solving A3 come approccio basato sui principi del Lean Thinking. Questo ha comportato l'analisi delle criticità attraverso l'osservazione diretta delle attività operative, la conduzione di interviste con gli stakeholder e l'utilizzo della Value Stream Mapping. Sono stati inoltre impiegati strumenti di analisi delle cause radice, come il diagramma di Ishikawa, per comprendere le cause strutturali alla base della mancanza di visibilità e responsabilità nel processo. Ciò ha consentito di sviluppare una comprensione approfondita del processo e di progettare contromisure appropriate.

Le contromisure si sono concentrate sul miglioramento delle pratiche di monitoraggio, sul rafforzamento della responsabilità dei Project Manager e sul miglioramento delle modalità di coordinamento tra le diverse funzioni aziendali. Sono stati introdotti meccanismi di monitoraggio strutturato per consentire una supervisione condivisa dell'avanzamento dei progetti, insieme al miglioramento della definizione delle responsabilità e delle pratiche di coordinamento. Inoltre, sono stati implementati meccanismi volti a migliorare l'integrazione dei feedback e ad avviare la raccolta strutturata delle conoscenze tecniche, ponendo le basi per il miglioramento della gestione dei processi e per il riutilizzo della conoscenza in futuro.

L'implementazione di tali miglioramenti ha generato benefici organizzativi significativi in termini di maggiore trasparenza dei processi, continuità della responsabilità e miglioramento della capacità di coordinamento tra le funzioni. Il processo si è evoluto da un modello informale, basato sull'esperienza individuale, a un processo più strutturato e controllabile, e la maturità del processo è migliorata significativamente in termini di visibilità, responsabilità e coordinamento. Questo ha rappresentato un passo verso una gestione dei progetti più proattiva.

Nel complesso, la presente tesi mira a dimostrare l'efficacia dell'applicazione dei principi Lean e della metodologia di problem solving A3 nel supportare il miglioramento organizzativo in un contesto reale. Questa esperienza ha contribuito al rafforzamento della struttura del processo e allo sviluppo di pratiche di gestione dei progetti più integrate.

Parole chiave: Problem solving A3, Lean Thinking, gestione dei nuovi ordini, visibilità dei processi, responsabilità di progetto, monitoraggio dei processi, standardizzazione dei processi, analisi delle cause radice, Value Stream Mapping, allineamento organizzativo, miglioramento continuo, integrazione della conoscenza, caso di studio industriale, gestione dei processi, miglioramento operativo.

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1 Introduction

1.1. Introduction to A3

In the contemporary industrial scenario, the operating context of organizations is characterized by increasing complexity, significant variations in demand, and increasing pressure in terms of time, cost, and quality aspects. In this context, the key driver of success for organizations is the ability to address their processes in a structured and systematic way. As a result, the effectiveness of managers depends on their capacity to timely detect problems, identify the reasons behind these problems, and design effective solutions that improve the overall performance of the processes instead of focusing only on solving problems after they happen.

From the Management Engineering point of view, solving problems is not only a technical issue but also a managerial one. In this context, Lean Thinking can be seen as an effective and established approach to address problems of process improvement. "In a lean organization, how do you want people to act? You want them to take responsibility, to work effectively in teams, and develop real expertise." (Ward, 2007, p. 227).

The various problem-solving approaches included in the Lean toolbox, such as the A3 methodology, are derived from the scientific management principles inherent in the Toyota Production System, which promotes experimentation, root cause analysis, and learning and improvement (Spear, S., & Bowen, H. K., 1999). Within Toyota's management system, structured tools like A3 reports are used to support decision-making, knowledge sharing, and systematic problem resolution in the organization (Morgan, J. M., & Liker, J. K., 2006).

A3 is a crucial concept in the literature of the Lean philosophy, not only as a report but as a problem-solving and learning technique. In "Understanding A3 Thinking," A3 can be viewed as a disciplined approach to support the organization in the problem-solving, scientific thinking, and learning throughout the organization (Sobek, 2008). Additionally, "Managing to Learn," portrays A3 as a useful technique for managers to develop solutions by using a thoughtful analysis, thus highlighting the importance of the A3 method in the context of the Lean philosophy as a bridge that connects the concepts of analysis and learning (Shook, 2008).

This thesis will be developed in the context of my experience during the period of the internship at GPACK S.p.A., a company that specializes in the production of luxury packaging in Italy. The problem that was identified during the period of the internship was the poor visibility of new job orders. A problem like this can create inefficiencies in the management of the plan, as well as in the coordination of the different functions of the company and so, introducing inefficiencies in the processes of the company. The problem seems to be a systemic one, thus making the company a good candidate for the application of a problem-solving approach.

The general objective of the present thesis is to show how the A3 problem-solving methodology can be correctly applied to a specific industrial process. More specifically, the objectives of the present study are:

- To analyse the current state of the process through a data-driven approach.
- To identify the causes of the inefficiencies of the process by applying problem-solving techniques from lean thinking.
- To develop and implement specific countermeasures in accordance with Lean principles.
- To measure the impact of the suggested countermeasures in terms of process performance and organizational clarity.

The methodological approach of the present thesis follows the general principles of Lean Thinking and Continuous Improvement. The A3 methodology will be used as the backbone of the analysis according to the methodological approach suggested by Shook, who says that the power of A3 lies in the discipline of following a logical problem-solving story from beginning to end (Shook, 2008). Therefore, other Lean tools such as Process Mapping and Root Cause Analysis Technique have been integrated into the A3 methodology to support a more rigorous analysis of the problem.

1.2. Company overview: GPACK S.p.a.

1.2.1. Company profile, vision and positioning

GPACK S.p.A. is an Italian industrial group, and its business is concentrated around the packaging sector of cosmetics and perfume, particularly focusing on the field of rigid and folding packaging, targeting especially luxury but also, in the slightest, mass segments. The origins of the company can be traced back to the mid-1990s, when entrepreneurial activities related to carton manufacturing and packaging commenced by the Bramucci family who founded the company in 1996. Over time, the company continued to increase its production capacity and technical skills, focusing on packaging solutions pursuing high aesthetic quality, customization, and the fusion of industrial skills with artisanal expertise. The journey taken by the company culminated in 2017 with the formal establishment of the GPACK Group as an integrated industrial reality in the packaging sector. By a process of aggregation and acquisition, Cartotecnica Goldprint and its related companies were integrated into a single group structure.

The group has developed an industrial configuration with multiple sites. The company's headquarter is in Truccazzano (MI), the other sites are located in Vailate, Cavaione, and other locations for specific product sectors. This is the industrial base for a diversified product portfolio ranging from luxury packaging for cosmetics and premium goods to general packaging, where packaging represents an element of differentiation and brand recognition.

Between 2020 and 2021, GPACK went through a period of financial and organizational difficulties, like the problems affecting all the industrial sector. During this period, GPACK went through debt restructuring and company reorganization, a period that represented a transition in terms of ownership and governance structures with the advent of an investment fund.

The vision of the firm is centred on the development of quality packaging solutions through the coordination of technical know-how, industrial capability, and aesthetic finesse. This is also clearly communicated through corporate communications that reflect the capability of the firm to merge artisanal skills with industrial production capability. This is also a reflection of the evolutionary history of the firm, where the competitive advantage was centred on the quality of the product.

From a strategic management point of view, GPACK acts as a vertically integrated group with internal capabilities for managing multiple stages of the value chain for packaging. GPACK has competencies in design support, prototyping, printing, finishing, and assembly in a multi-site production approach. This structure gives the firm the opportunity to serve multiple and varied market segments, with the capacity for customized approaches for various customer requirements.

In terms of corporate values, the main principles followed by GPACK are quality, innovation, customer orientation, and environmental responsibility. These principles are highlighted as key elements that guide the operation and development of the firm, with particular reference to the selection of materials, the production process, and the application of environmental standards. GPACK has over time intensified its commitment to sustainability and corporate responsibility. The firm publishes sustainability reports that highlight its development path, environmental activities, and certification processes, which is an indication of an increased focus on regulatory compliance.

Overall, the historical evolution and current profile of GPACK S.p.A. indicate a company that has been through a period of significant product-oriented growth, industrial consolidation, and a dramatic change in its ownership and control. A product-driven industrial organization in a competitive market (in which technical excellence and customization are central concerns in the company’s strategic posture), provides a relevant and proper background against for analysing the company’s managerial and operational processes with reference to coordination, visibility and decision-making issues that are central to the current thesis.

1.2.2. Geographical presence and company growth

GPACK S.p.A. mainly conducts business on an international level, with a diversified customer portfolio spread across various geographic markets. A significant portion of the company's revenues are generated outside of Italy. This is due to the fact that the company has an export-based business model and has positioned itself as a key player in the international luxury and premium packaging industry.

GPACK S.p.A. has a primary customer segment located in the European region, which is composed of prominent brands[1] operating in the cosmetics. In this region, the company has an added advantage due to its proximity to key luxury markets such as France, Germany, and Switzerland, which serve as key hubs for packaging demand for the beauty and personal care industry.

However, the company has also managed to expand its reach to other geographic markets outside of Europe through partnerships with international brand owners and multinational companies. For instance, the company has developed business relationships with customers located in the North American region and specific markets in Asia, which have witnessed an increased demand for premium packaging solutions in recent times. This can be attributed to the globalization of the luxury and premium goods industry, which relies on packaging as a key driver of brand positioning and consumer perception.

On the other hand, as a company that operates in multiple markets, you have to integrate commercial, technical, and production teams. This is because customer requirements, regulations, and standards vary significantly from one region to another. In short, the geographical presence of GPACK translates into a business model that focuses on high-value, design-oriented markets, instead of trying to approach the market based on a cost leadership strategy and on volumes. This is a global business that, in effect, lifts its revenue, but also introduces a level of complexity, which is why process management is vital within the organization.

[1] Versace, Dolce & Gabbana, Penhaligon, Moschino etc…

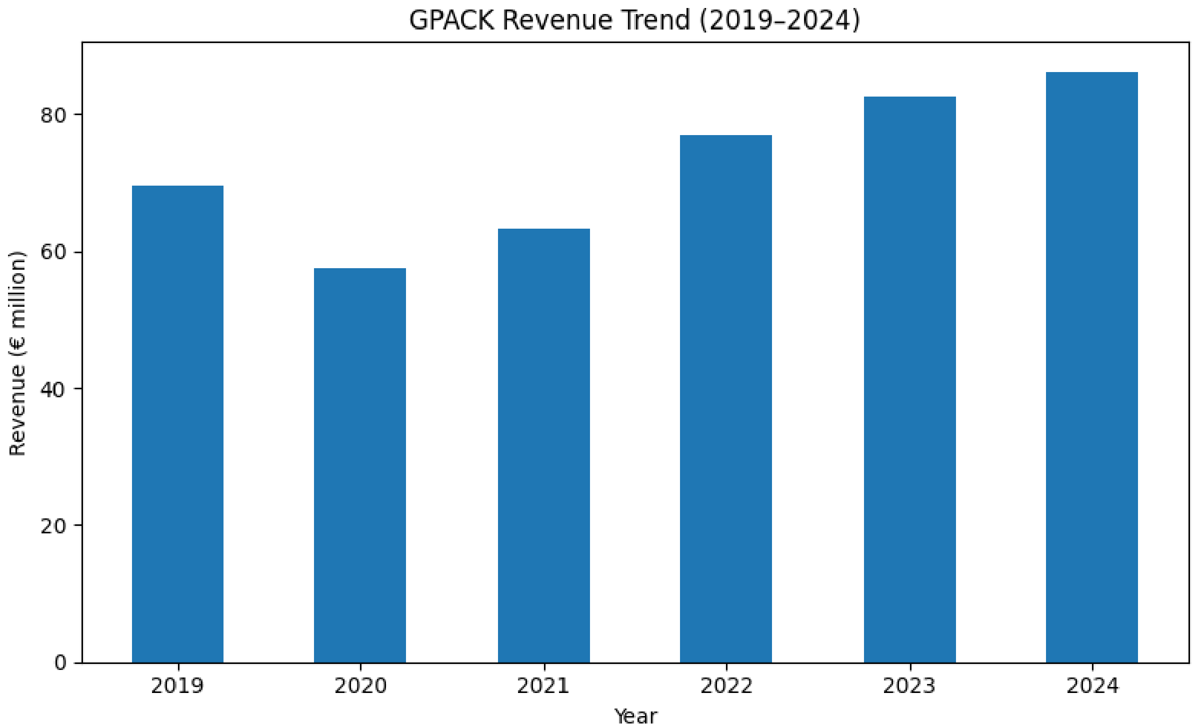

Figure 1 - Revenues of GPACK

The economic growth of GPACK S.p.A. in recent years can be observed through the evolution of consolidated revenues over the period 2019–2024, as illustrated in Figure 1.

The revenues for 2019 start at around €69.5 million, a good foundation for what is to come. However, there is a drop in revenue for 2020, reaching around €57.5 million, which is understandable due to the overall disruption caused by COVID-19 in all sectors of industry and markets, including packaging. However, there is a good uptrend in revenue growth for 2021, reaching around €63.3 million, indicating a good start for operations and markets as they begin to recover from the pandemic. The uptrend is even more pronounced for 2022, as revenues were around €76.9 million, indicating a good pick-up in operations and market performance. The uptrend is maintained for 2023, reaching around €82.5 million, and further for 2024, reaching around €86.2 million. These last two years of growth indicate that the company has sharpened its position in markets, thanks to previous restructuring and governance. It also interesting to underline that in 2024 the profit reached almost €8.5 million.

The increase in revenues earned by GPACK S.p.A. indicates a complex operational scenario caused by increased production volumes and so, a need for organized process management, coordination, and problem-solving skills.

1.2.3. Plants and Warehouses

GPACK S.p.A. operates in a multi-site industrial network in the Lombardy region, which provides the backbone for its vertically integrated packaging solutions. From the company's available information on its operations and from the thesis experience there, its headquarters and main production site are located in Truccazzano (MI), covering more than 14,000 square meters. This site contains a large percentage of its core production activities, as well as its vital support functions except for the technical office and some commercials.

The production configuration of the group is characterized by an evident division of labour, where each of their sites specializes in specific functions and products. Let's take Vailate, where I've experienced the internship of this thesis: it is mainly specialized in luxury packaging, it has to deal with high-end products that require advanced finishing, sophisticated design, and an integration of craftsmanship and efficiency. In other words, Vailate represents the flagship of the group, where the big part of premium and design-oriented packaging solutions is developed.

On the other side, Truccazzano has an older history of more varied tasks. Although it has started to specialize more in luxury packaging, this is still a relatively new trend and one that hasn't penetrated as deeply as in Vailate. Today, Truccazzano represents a more heterogeneous site, supporting both premium and more general packaging, and acting as a key center for coordination at the group level.

Another key element in the industrial layout of GPACK is the Cavaione plant. Unlike the other two plants in Truccazzano and Vailate, Cavaione is not an independent plant in terms of production. It is mainly a plant for assembly and finishing. The semi-finished materials from Vailate and Truccazzano are dispatched to Cavaione, where they are assembled into a rigid box usually utilized in packaging perfumes, creams, and other luxurious cosmetic materials. So, it is clear that Cavaione is an "internal customer" who depends on the timely receipt of semi-finished materials from the other two plants

Apart from its own production sites, another key dependency for GPACK is its warehouse infrastructure. These warehouses are vital to control the flow of raw materials from suppliers, semi- finished products between sites[2], and finished goods to the customers. This flow must be timely, because potential delays can generate downtime to internal customers (Cavaione) or reduce overall customer satisfaction and, of course, this aspect is critical in both Vailate and Truccazzano.

It can be understood that this multi-unit infrastructure also poses challenges. For instance, to effectively manage activities at Vailate, Truccazzano, and Cavaione, information sharing, planning processes, and responsibilities are required. Also, due to the high interdependencies between the units, especially for the flow of goods to Cavaione at the semi-finished stage, robust planning is required.

[2] Also between departments of the same site

1.2.3.1. The Vailate plant (internship site)

The production organization of the Vailate plant is structured around the following main departments (not including sales office and technical department):

- Pre-press: They work with the customer's artwork[3], transforming it into production files by reworking it and planning the technical specifications. This involves deciding on the materials and whether the design will work with what the factory can produce. Once the artwork is approved by the client, the design officially enters production.
- Offset printing: Once production files are approved, the chosen sheets from the raw materials warehouse will be moved to the offset printing department, where indirect printing machines will be utilized. At this stage, the sheets will be given ink and a varnish depending on the desired look. The varnish will be dried using UV lamps built into these printing machines, thus preparing it for further processing.
- Hot stamping and embossing: After printing, the pieces proceed to the hot stamping and embossing section. In this section, hot melt tapes add to the carton finishes such as gold written text, metallic logos, and intricate designs. Additionally, the embossing and debossing of the carton are done at this stage. Two factors influence this process: heat and pressure. The heat acts on the metallic foil, and the right amount of pressure ensures a clean transfer and visibility of the design on the paper.
- Die-cutting: Once printed and decorated, the sheets are then taken to the die cutting department for cutting and shaping using dies that correspond to the folding box (or rigid box) shapes. This process transforms the sheets into preformed packaging materials for the folding and gluing department or for assembly in Cavaione.
- Cleaning phase: After the die-cutting process, the items undergo a cleaning stage where the remaining cut material is brushed away. This ensures that only the right separated components move forward in the process (all the process is done manually).
- Quality control: The quality control department ensures the precision of the size, checks the appearance to guarantee it matches the design, and ensures it meets all technical specifications. This inspection process is very important to secure that all products are compliant before proceeding to the next manufacturing process.
- Folding and gluing: (only for the folding boxes) In the folding and gluing section, specialized machines bend the cut-out pieces into place and apply glue, thereby transforming them into the final three-dimensional form of the folding

[3] It's the idea of design of the final product in a pdf with all the specifications

boxes. This completes the transformation of flat sheets into functional packaging.

Once completed, the cartons are then stored in the finished goods warehouse until they are shipped. From there, the products are shipped to the customers based on the delivery time and the priority of each order.

1.2.4. Product portfolio

GPACK S.p.A. offers a diversified product portfolio primarily structured around two main families of packaging solutions:

- Folding boxes (astucci) are a key part of the company's product offerings, mainly produced at the Vailate and Truccazzano plants. These are distinguished by high-level printing, precise die-cutting, and advanced finishing techniques like embossing, hot foil stamping, and laminating. Folding boxes are widely used in cosmetics and luxury goods, where packaging is an essential marketing tool. From a manufacturing standpoint, producing folding cartons in a luxury sector requires a flexible production system, quick changeovers, and a high level of interdepartmental coordination.

Figure 2 - Example of a folding box

- Rigid boxes (scatole rigide) are the second main product category, which follows a slightly different production process. In this case, the printed and laminated boards, die-cut elements, and internal supports are manufactured in Vailate and Truccazzano. These elements are then shipped to the Cavaione factory, where the final assembly takes place. Cavaione is a factory that is specialized in the production of the rigid structure, gluing and finishing operations that transform the semi-finished products into finished boxes, which are usually used to package perfumes, creams, and other luxury cosmetic products all together.

Figure 3 - Example of a rigid box

1.2.5. Working environment and organizational context

The working environment of GPACK S.p.A. in Vailate is agile and production-oriented with a strong focus on technical abilities. The company has a young workforce, especially in technical and operational positions, which contributes to the dynamic and flexible atmosphere.

In the period of the internship, GPACK carried out a process of improvement through a Kaizen event (one week), led by external consultants. This event is a critical moment of reflection on the existing processes, rather than a routine activity as part of the standard operating procedures of the company and it has started to change the mindset of the people in the plant.

At production level, coordination between departments is primarily done on a person-to-person basis. This approach is highly dynamic and flexible but leaves room for success to be determined by the individual rather than the process and it lacks structured communication.

The company is in a phase of organizational evolution, where business growth and increasing production levels are creating the conditions for the improvements of its processes and planning practices and the kaizen event could have given that extra push to reach them.

2 Theoretical background

2.1. Lean thinking and continuous improvement

Lean Thinking is generally considered a comprehensive management philosophy rather than an aggregation of separate management tools. As a management philosophy, Lean Thinking has its roots in the Toyota Production System, which primarily focuses on creating value for the customer by systematically eliminating waste, reducing variability, and aligning processes, people, and management practices. Lean Thinking can be considered a socio-technical approach, which combines technical aspects of processes, organizational culture and leadership, including people in its decisions.

At its core, Lean Thinking consists of a set of fundamental principles that define the way an organization identify value, eliminate wastes and manages its operations thanks to continuous improvement (Womack, J. P., & Jones, D. T., 1996). These principles provide a complete picture of the processes which create value, as well as the processes by which waste can be systematically eliminated. These principles can be summarized as follows:

- Value definition from the customer's perspective: Organizations need to understand what constitutes value from the customers' point of view based on the features, quality, and service of the product and their timely delivery.
- Identification of the value stream: Organizations need to understand and analyse all the activities that are critical for the provision of a product or service so that value added and non-value added activities could be identified and inefficiencies made visible to be addressed.
- Creation of flow: Organizations need to design their operations in a manner that there are no interruptions, delays, and/or bottlenecks so that the flow could be created and have no interruptions.
- Establishment of pull: Organizations need to start their production and service operations only when there is a demand from the customers rather than running the operations based on forecasted demand.
- Pursuit of perfection through continuous improvement: Lean philosophy believes that there is no end in improving the operations and pushing organizations towards perfection.

Apart from these principles, perhaps the most emphasized element in the Lean approach (and in the Toyota Production System) is the need for the identification and elimination of waste, or Muda, understood as any action that consumes resources without any value being created from the customer's perspective (Ohno, 1988).

Regarding the Lean approach, there are seven different categories of waste that are usually identified, and these categories comprise overproduction, waiting, unnecessary transport, overprocessing, excessive unnecessary inventory, motion, and defects. However, the identification and elimination of these categories of waste are not considered an end in themselves (Ohno, 1988).

Another important aspect of the Lean approach is the emphasis placed on the stability of the processes. In other words, the Lean approach places significant emphasis on the need to standardize the processes to ensure their stability before any improvements can be made. This stability of the processes is seen as a prerequisite to any improvements (Imai, 1986).

Lean management emphasizes structured problem-solving and continuous learning as essential components of organizational improvement (Liker, 2004). Continuous improvement, or Kaizen, is an important part of the Lean approach but not the only part. In other words, the philosophy of the Kaizen approach to improvement is the recognition of the continuous nature of improvement, in addition to that, the approach recognizes the importance of involving people at all levels to observe and contribute to the improvement process (Imai, 1986). In other words, the approach recognizes that mistakes should be seen as learning experiences.

There are two types of Kaizen. First, there can be Kaizen events. This refers to episodic improvement events where a group of people with varied functions can focus their collective efforts to improve a particular process (Imai, 1986). Second, there can be daily Kaizen. This refers to small-scale continuous improvement activities where individuals can participate in continuous improvement activities as part of their normal day jobs. Although the results of Kaizen events can be quick and visible, the only way to sustain performance improvement is to create a culture of continuous improvement, which is pursued through a change in the approach to everyday situations.

Management is an important part of the Lean system. In the Lean system, the management of the organization is not only the decision-maker but also the catalyst to the implementation of a well-structured problem-solving mechanism. Instead of providing answers to problems, the management can be encouraged to pose questions and support the organization to develop its own understanding of the problem based on empirical data and observation. In a complex environment with multi-site operations and increased customer demand, the implementation of the Lean principles would provide a coherent mechanism to address the managerial and operational problems related to coordination, visibility, waste elimination, and continuous improvement (Liker, 2004).

2.2. A3 problem solving methodology

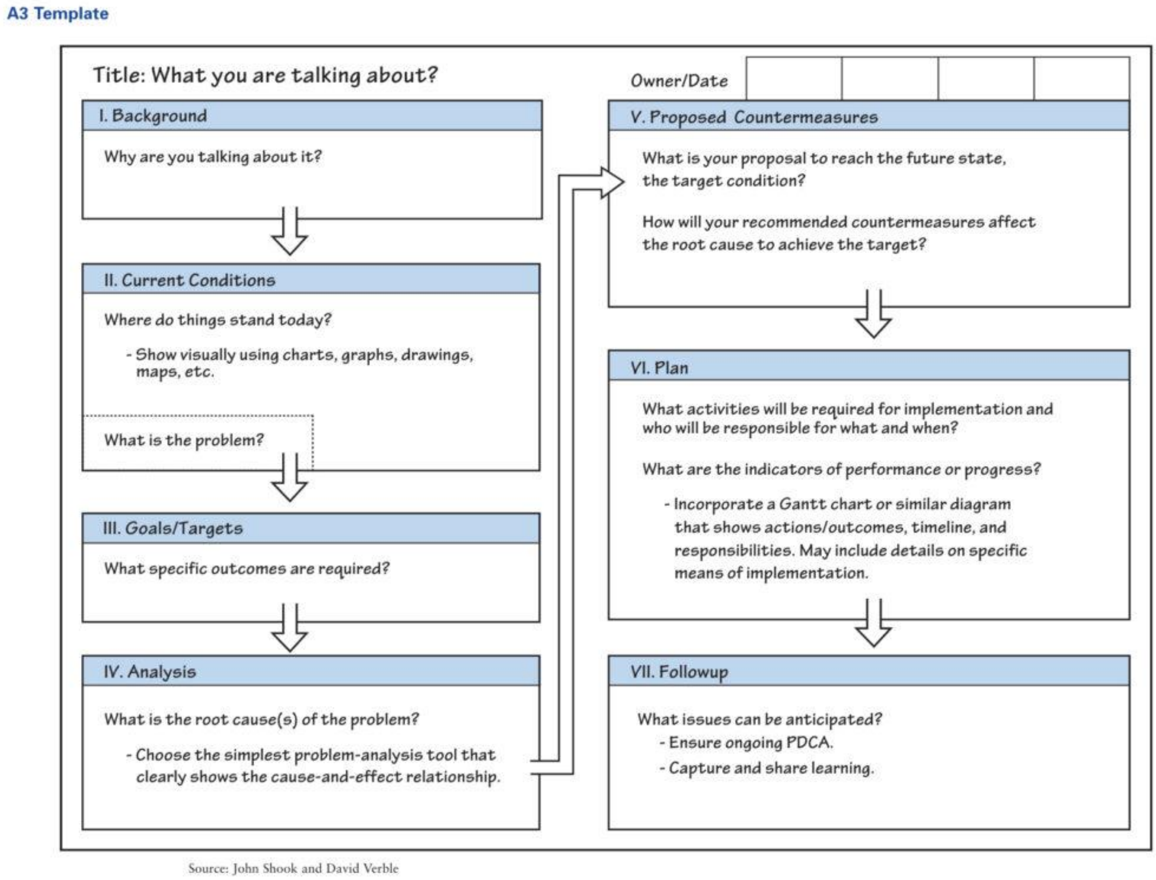

Figure 4 - Scheme of A3 Model (Shook, 2008)

In the Lean management system, the A3 process is more than a simple problem-solving technique, it's a two-part approach that combines problem-solving and learning. The A3 process is clear that it's not just a form or a report, but a thinking tool that helps people and organizations understand the issue and develop logical solutions (Shook, 2008; Sobek, 2008). This methodology has been defined as a system of coherent logic that links problem analysis, decision, and action in a holistic manner.

The term "A3" was chosen because the paper size for the entire problem-solving process typically ranges from A3. This size was not chosen arbitrarily, in fact, it helps the problem-solving process remain simple and concise. By working through the A3, the practitioner is challenged to reduce a complex problem to its most basic components, keeping away unnecessary detail while maintaining logical consistency. The A3 process is more than a simple problem-solving technique, but it's a learning and communication tool (Shook, 2008). This methodology supports strategic alignment and enhances organizational problem-solving capabilities in complex operational environments (Santhiapillai, 2023).

From a management point of view, the A3 methodology can be defined as a problem-solving tool that meets three interconnected needs. First, it can be defined as a problem analysis tool that assists the practitioner in finding a logical sequence of problem analysis, execution, and learning. Second, the A3 methodology is a cross-functional alignment tool that assists in creating a picture of the problem or solution. Third, it is also a learning tool that not only captures execution but also captures the rationale behind the solution. A summary of the A3 process can be explained in the following stages (Shook, 2008):

1. Background and context: A description of the context in which the problem arose, including the process and data. The intent here is to create a common, reality-based understanding of the situation prior to examining the causative factors.
2. Problem breakdown: A clear description of the problem as a gap between the existing condition and the desired level of performance, including what's not working as it should, what it affects, and the consequences.
3. Root cause analysis: An examination of the reason for the problem. Root cause analysis usually involves asking questions and collecting data, aided by tools such as the Ishikawa Diagram or the 5 Whys.
4. Target condition: A clear description of the desired future state of the process that is both realistic and desirable, that can be divided in must have and nice to have.
5. Countermeasures development: An identification of the solution to the problem, including the logic behind the solution, which has to be realistic.
6. Implementation plan: The development of the countermeasures into a plan that's perceived as an experiment, instead of being the final solution.
7. Follow-up and learning: A comparison of the outcome to the target condition and the discovery of new opportunities.
8. Standardize and share success: The standardization of the solution by revising the standards, procedures, or visual aids, and the sharing of the lessons learned to prevent the recurrence of the problem and to enable the replication of the solution.

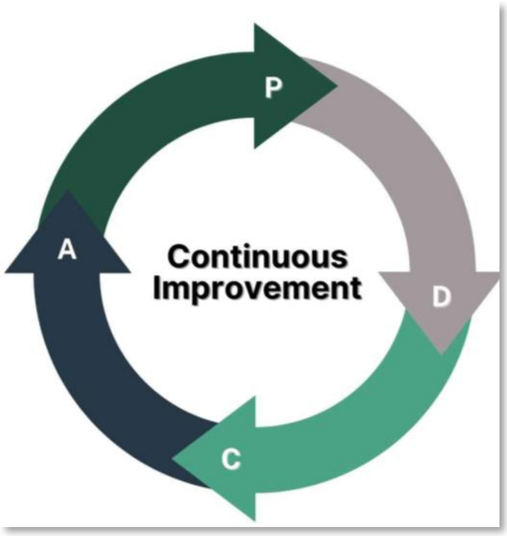

Figure 5 - PDCA

At the base of the A3 methodology and all the tools that support it, there is the Plan–Do–Check–Act cycle (Figure 5). PDCA is the underlying logic that governs continuous improvement in a Lean management system and uses a learning cycle that consists of a plan based on a thorough understanding of the current condition (Plan), the thoughtful and deliberate execution of the plan (Do), the assessment of how well the execution of the plan aligns with the future state (Check), and the use of the learning to standardize or refine (Act) (Deming, 1986). Structured problem-solving approaches like PDCA enable organizations to analyse processes and implement improvements based on data and performance evaluation (Oakland, 2014).

The logic of the PDCA cycle is already included in the A3 methodology in each of the different phases of its implementation. The formulation of the problems, the analysis of the current situation, and the identification of the countermeasures are included in the planning phase. The implementation of the countermeasures includes the doing phase. The follow-up and the results monitoring include the checking phase, instead, the standardization of the effective practices and the refinement of the countermeasures include the acting phase. The PDCA methodology has been widely applied in industrial environments to improve process performance and reduce defects (Realivazquez-Vargas, A., Arredondo-Soto, K. C., Carrillo-Gutiérrez, T., & Ravelo, G., 2018)

The A3, in the context of the thesis, represents a coherent framework for analysing the operational problems in GPACK. The A3 methodology appears to be particularly appropriate to deal with the problems of coordination and visibility in an industrial scenario.

2.3. A3 supporting tools

The A3 methodology can be said to function as a discipline for thinking and learning, and this is largely supported through a body of Lean tools that enhance the rigor and transparency associated with the problem-solving approach. In consonance with the theoretical perspective on A3 as exposed through the Lean literature, the Lean tools are not intended for mechanical or standalone use, but they facilitate thinking, discussions, and understanding through the A3 logical framework (Shook, 2008).

2.3.1. Value Stream Map

One of the most used tools in the Lean methodology of process analysis and problem-solving techniques such as the A3 methodology is Value Stream Mapping (VSM). The tool helps in the visualization of the flow of materials and information throughout the entire process, beginning with the time the customer places the order and ending with the time the customer receives the product or service.

From the methodological point of view, Value Stream Mapping helps in the identification of the value adding and non value adding activities in the process (Rother, M., & Shook, J., 1999). Differentiation between these two types of activities helps to identify the points where wastes are generated. One of the key strengths of the tool is its comprehensive approach. Instead of evaluating the performance of each individual activity of the process in isolation, the VSM method analyses the process as a whole, including the interdependencies of separate functions or departments. This is especially important in the complex industrial environment where the optimization of the process in one department can have a negative impact on the performance of the overall process. “This is visual management: making abnormalities visible to all employees, managers, supervisors, and workers so that corrective action can begin at once” (Imai, 1986, p. 96).

During the application of the A3 methodology, the Value Stream Mapping method is useful in the analysis of the “AS IS” state by offering a precise understanding of the process’s current state of operation. In the process of mapping the “AS IS” state, the process is directly observed at the workplace and through interaction with the people who are directly involved in the process’s operation. This is in accordance with the Lean philosophy of “go and see,” which seeks to avoid assumptions and instead offers an exact understanding of the process from the viewpoint of its real operation.

Value Stream Mapping is also useful in offering the possibility of defining the “TO BE” state. After the identification of the problems, the VSM method is useful in helping the user imagine new configurations of the process which can lead to its improvement. In this respect, the Value Stream Mapping method is not only a diagnostic tool but also a strategic tool for the formulation and implementation of improvement actions in accordance with the overall goals of the A3 methodology.

2.3.2. Root cause analysis

Root cause analysis is an essential part of A3 methodology, which ensures that the countermeasures, which we are about to suggest, are not just addressing the surface of the problem but are tackling the root causes of the problem to ensure sustainable process improvement (Ohno, 1988). Considering the tools which can facilitate the above process, the most important tools are the Ishikawa diagram and the 5 Whys method.

Ishikawa diagram, which takes into account different parameters such as Methods, Machines, Materials, people, Measurement, Environment can facilitate the analysis of possible causes of the problem. This can help in analysing the problem from different perspectives rather than just looking at the problem from the surface. The Ishikawa diagram can facilitate a discussion on possible causes of the problem and how these can be integrated with other parameters of the problem through the diagram, supporting a comprehensive root cause analysis process (Ishikawa, 1985). "What keeps us from reaching what we want to achieve, our future state, our target condition?" (Shook, 2008, p. 39).

Within the framework of the A3 methodology, the Ishikawa diagram should not only be viewed as a list of the possible causes of the problem, which is what it represents, but rather as a collaborative process of analysis with the goal of understanding the interaction between the various components of the system and how they generate the problem, which is at the heart of the Lean philosophy and the A3 methodology, instead of searching for people as the source of the problem.

It is normal practice to use the 5 Whys method in combination with the Ishikawa diagram to further analyse the causes of the problem. This method consists of asking "why" about a specific problem, which is the first step in the scientific method used in A3 problem-solving methodology: constant questioning and research into the causes.

One of the key aspects of an effective root cause analysis is to focus on data and observations, instead of opinions and assumptions. It is important to verify that the causes identified through the Ishikawa diagram and the 5 Whys method was found by using data, observing the operations, and conducting tests. This has the major advantage of ensuring that the solutions arrived at are data based and provide long-term solutions.

From an organizational point of view, the structured root cause analysis has the advantage of promoting learning and development. This is because the A3 method enables individuals and teams to reflect on their analytical approaches and potentially improve their problem-solving skills and collaboration.

2.3.3. Integration of tools

Another significant aspect of successful problem solving through the A3 methodology is the ability to integrate these tools in a unified framework (Shook, 2008). In other words, process mapping, Ishikawa diagrams, and 5 Whys are not to be used in isolation of each other. In fact, these tools have to be used together as part of one unified problem-solving process and when they are correctly aligned in a unified framework, these tools become part of the A3 problem-solving process. This provides a sense of continuity and consistency in the process.

This is of critical importance to ensure that any issue of fragmentation in analysis is correctly addressed, along with minimizing any potential conflicts of interpretation amongst all stakeholders. The importance of these tools is not just their relative utility as a tool but their usage as part of the larger A3 process.

The concepts of Lean Thinking, A3 methodology, and the supporting tools developed in the chapter represent a comprehensive theoretical and methodological framework that is relevant to the analysis that is to be carried out in the following chapters of the paper. Lean Thinking helps to address the organizational/managerial issues of continuous improvement, while the A3 methodology provides a framework to address the concept of Lean Thinking in terms of a problem-solving process, and the supporting tools provide an approach to address the analysis in a rigorous, evidence-based, collaborative manner.

3 A3 application

3.1. Problem framing

3.1.1. Problem background

In recent years, the process of developing new orders at the Vailate facility has become increasingly complex due to the changes that have occurred in the structure of the market dynamics and especially the new needs of the clients. As it can be discovered from the interviews with the Head of Technical Office and various commercial representatives, in the luxury packaging sector of cosmetics and perfumes, the growth of the clients' revenues is directly linked to the continuous introduction of new product variants that are often launched simultaneously in coordinated campaigns (for example, the launch of various formats such as 5 ml, 20 ml, 50 ml, and 100 ml as part of the seasonal campaign of a brand), rather than the high-volume and repetitive orders that have been the norm in past years.

As a result of the changes that have occurred in the market dynamics of the sector, the number of new orders has significantly increased (referred to as "blue orders" internally), while the average volume of the single order has decreased. So, the organization is required to deal with an increasingly large number of technically complex orders that are associated with high aesthetic and functional demands that are characteristic of the sector and obviously, the number of setups needed for a machine in the plant is higher.

In this system, two types of orders coexist:

- Blue orders: These are associated with the development of new projects, that the Project Managers (PMs) should create and manage.
- White orders: If the customer request the same product of a previous order, the blue orders become white (internally), these are associated with the routine production of the Customer Service department, which does not have the task or the skills to change the technical data sheet (any latent problems will also remain in white orders).

On paper, every blue order has a PM who is responsible for the order. However, in practice, the sense of ownership throughout the entire process is not always taken. The rising trend of the creation of new projects has revealed the structural limitations in the current process governance system. The information related to the status of projects and process parameters is distributed across individual files and informal communication channels. There isn't a centralized and standardized approach that is being followed to monitor the progress of projects. Furthermore, the ERP system's current potential to monitor projects is found to be wanting, and a system of escalation to proactively address any delays or lack of information is also absent.

A clear example of the structural limitations in the current system can be drawn from the gap between the planned and the actual project timelines (Figure 6 and Figure 7). Although retro planning is typically incorporated at the start of a project, the monitoring of the same is not part of a structured system (verified thanks to the interviews conducted with the PMs).

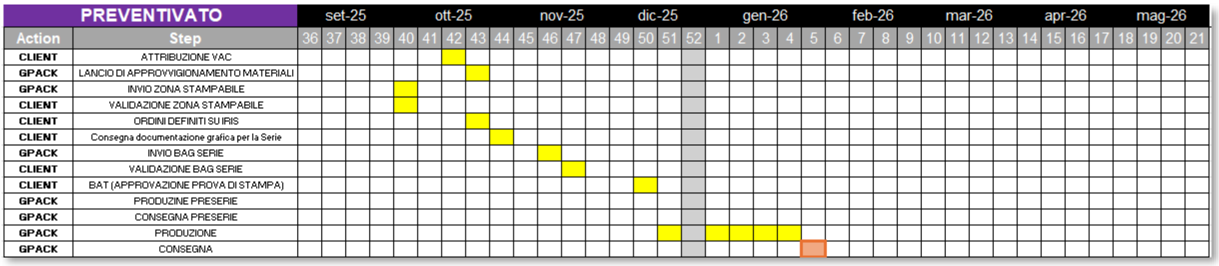

Figure 6 - Scheduled retro planning with the client

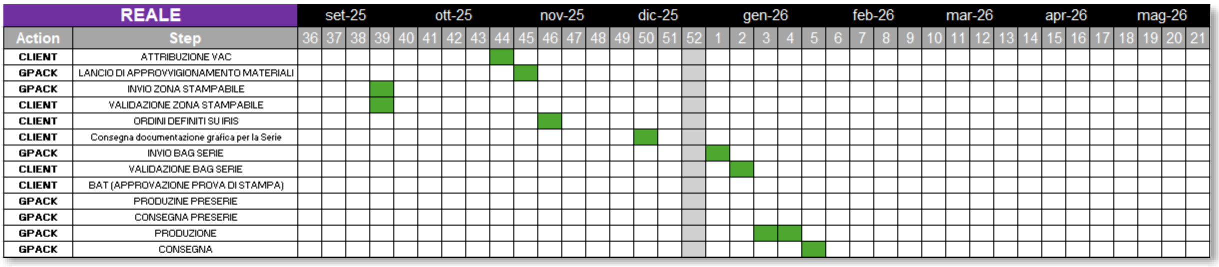

Figure 7 – Actual process

As clearly demonstrated in Figure 6 and in Figure 7, it becomes visible to everyone that there are divergences between the planned and the actual execution, without any proactive identification. In the context of the specific example, there was no systematic request of feedback from the customer, in accordance with the specific milestones that had been designated, and the problem was resolved in a reactive manner at the subsequent phases. Despite the divergences, the final delivery was completed on time, thanks to the high level of flexibility that the production department had, which reorganized their priorities. This case can help to demonstrate the absence of visibility and the absence of standardized mechanisms for controlling the process within the system.

The lack of the feedback loop also raises the probability of recurring problems, especially in the context of white order productions. The problems that are faced in the context of the previous productions are solved in that moment in production but then the new information not always return to the project managers that can change the technical datasheet.

There are also challenges in technical information management. The operators in the plant usually record information about the parameters of machine processing on sample sheets or locally store it in machine control systems where possible. However, this information is not associated with production order documents because it was never done before.

In conclusion we can say that, while the Vailate plant excels in terms of technical capacity and production flexibility, its current new orders management system does not have structural robustness or monitoring standards, in fact, the system still relies on individual expertise and downstream coordination.

3.1.2. Process description and current state analysis

The process of developing new orders at the Vailate plant occurs according to a set of formally identified milestones, even though their monitoring is not supported by a structured and centralized control approach. In fact, each Project Manager (PM) has their personal tracking files, even though formally responsible for this, systematic control of the advancement of the projects is not guaranteed and can happen that they don't meet the planned dates, but these situations are not visible to everyone.

Based on the four fields map (Figure 8), the process can be structured into four main macro-phases. The inefficiencies are represented in the yellow clouds.

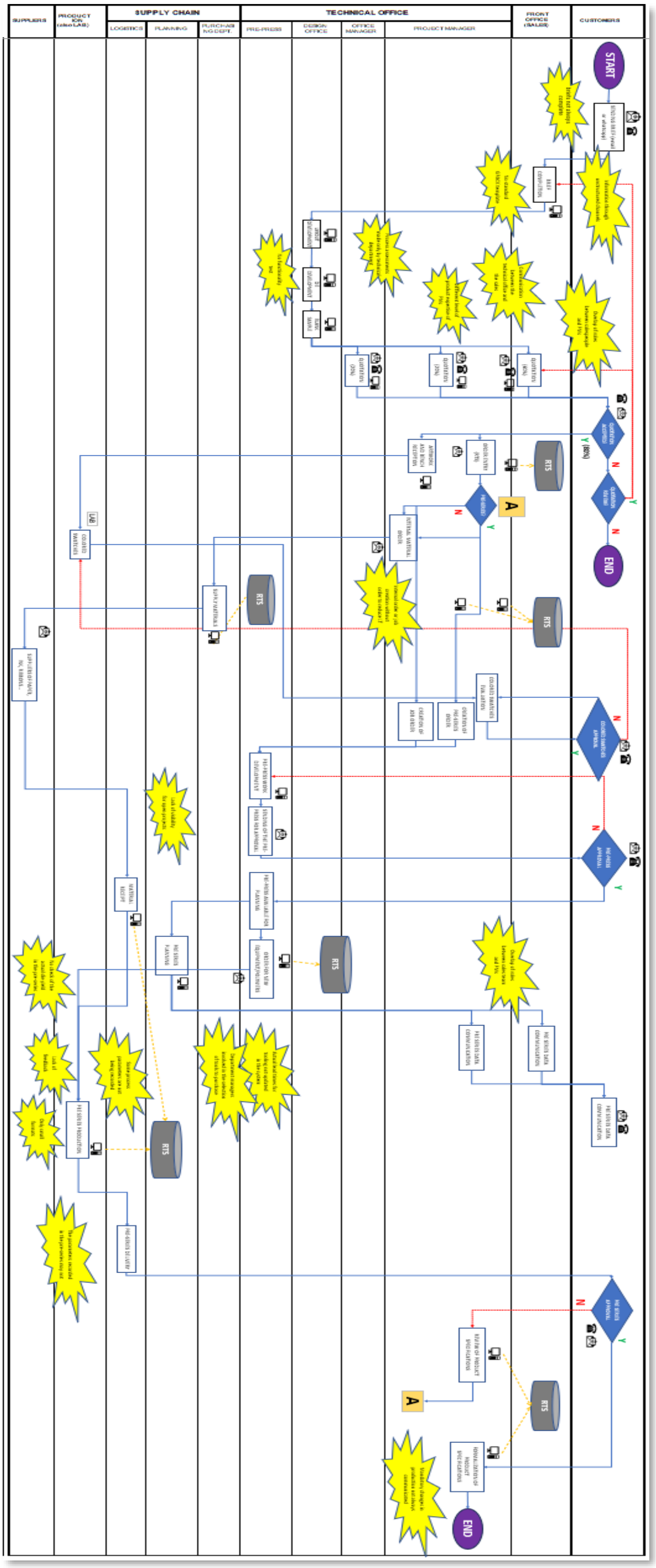

Figure 8 – Four fields map

3.1.2.1. Order reception and quotation

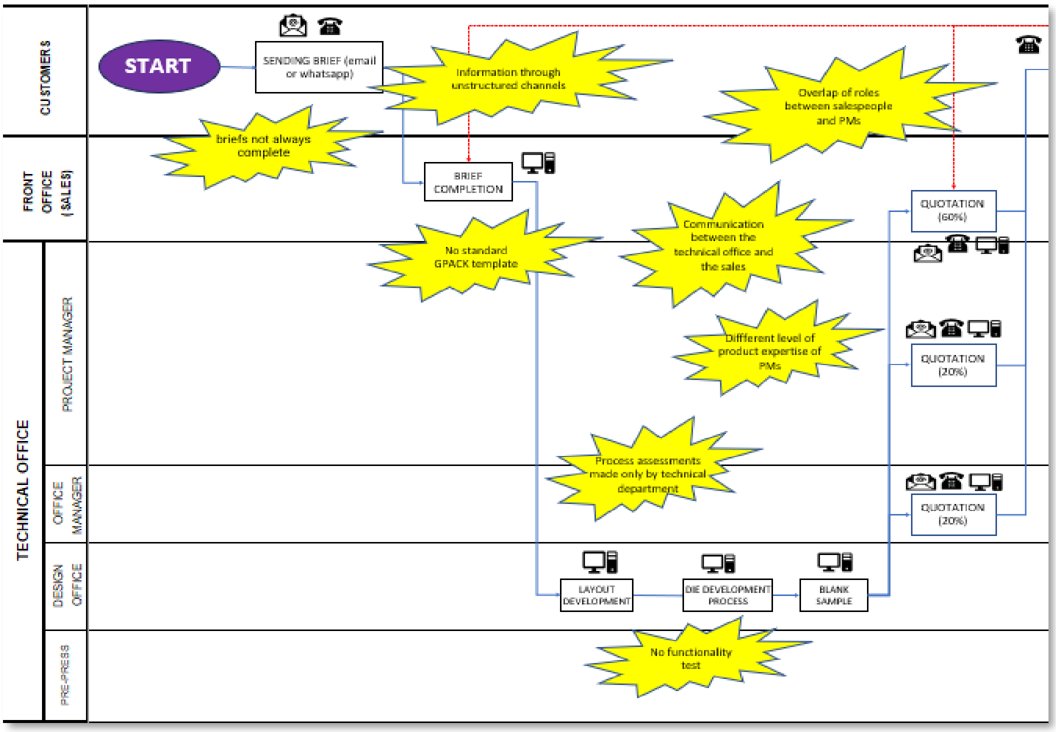

Figure 9 - Order reception and quotation

The process starts by the customer sending a brief (a quick explanation of the project required) to the commercial department. Ideally, the commercial department would forward the brief to the concerned PM, who would be in charge of the entire process of technical analysis and development of the project. However, in some instances, the salesmen bypass the PMs, and the interaction takes place directly between the commercial department and the customer. For the customer talking about technical specifications with a salesman can give the idea that the firm is not structured with a strong technical office. This was understood by interviewing the commercials.

After the process of brief analysis, a quotation process takes place. Ideally, the process of quotation would be coordinated by the concerned PM. It can happen that the process of quotation may be directly managed by the commercial department or the Head of the Technical Office, but it's accepted by everyone due to the lack of experience of some project managers.

3.1.2.2. Order formalization, technical validation and artwork processing

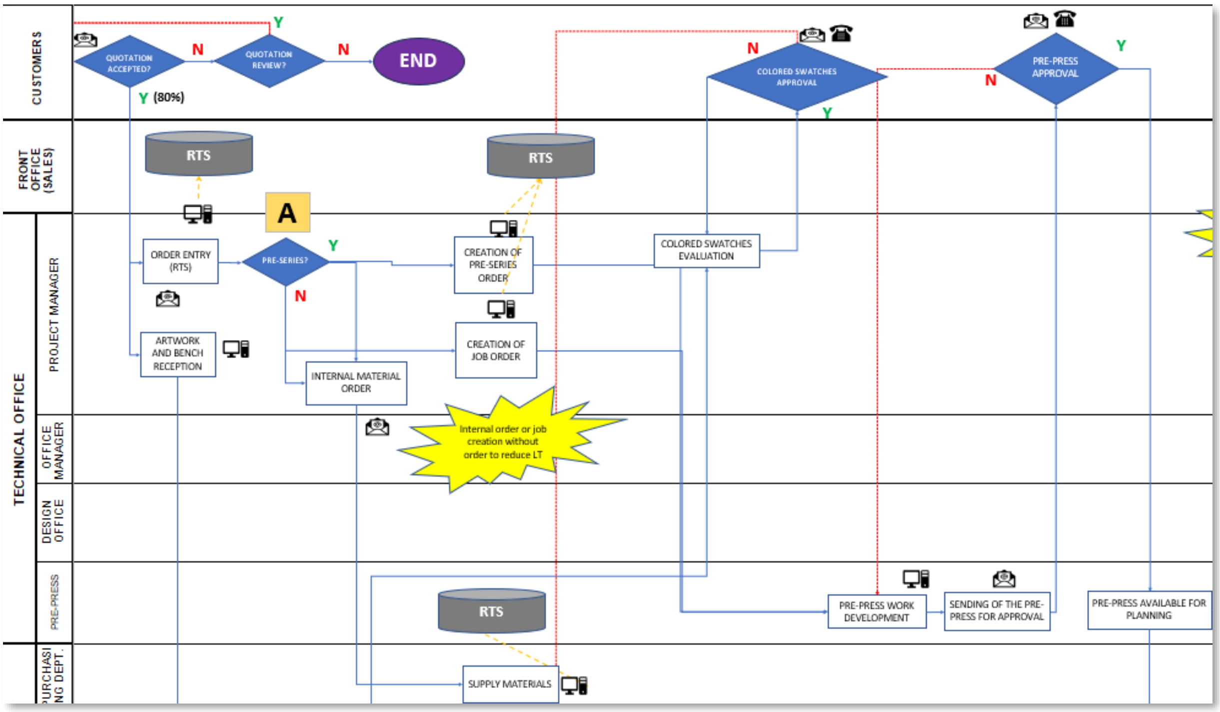

Figure 10 – Order formalization, technical validation and artwork processing

Once the quotation has been accepted, the customer order is entered into the ERP system (RTS). At this point, the PM is expected to start internal material orders and officially open the job order, which can be a pre-series or a full production batch. Although the milestone steps are clearly defined, the monitoring of these steps is decentralized and not visible.

Once the order has been formalized, the prepress department become the main actor. The artwork provided by the customer, through the mediation of the PM, is worked on and made ready for approval. The prepress department works in conjunction with the PM in the management of tooling purchases for the offset printing and hot stamping activities (polymers, clichés).

The process cannot begin without the approval of the artwork. However, the monitoring of intermediate readiness conditions is not subject to a structured escalation process. As shown in the retro planning example in Figure 7, it is possible for deviations from the planned milestones to happen without any proactive action, which may result in a rush to deliver the product in the subsequent process. It's clear that the main problem is the lack of visibility of new job orders.

3.1.2.3. Planning and production execution

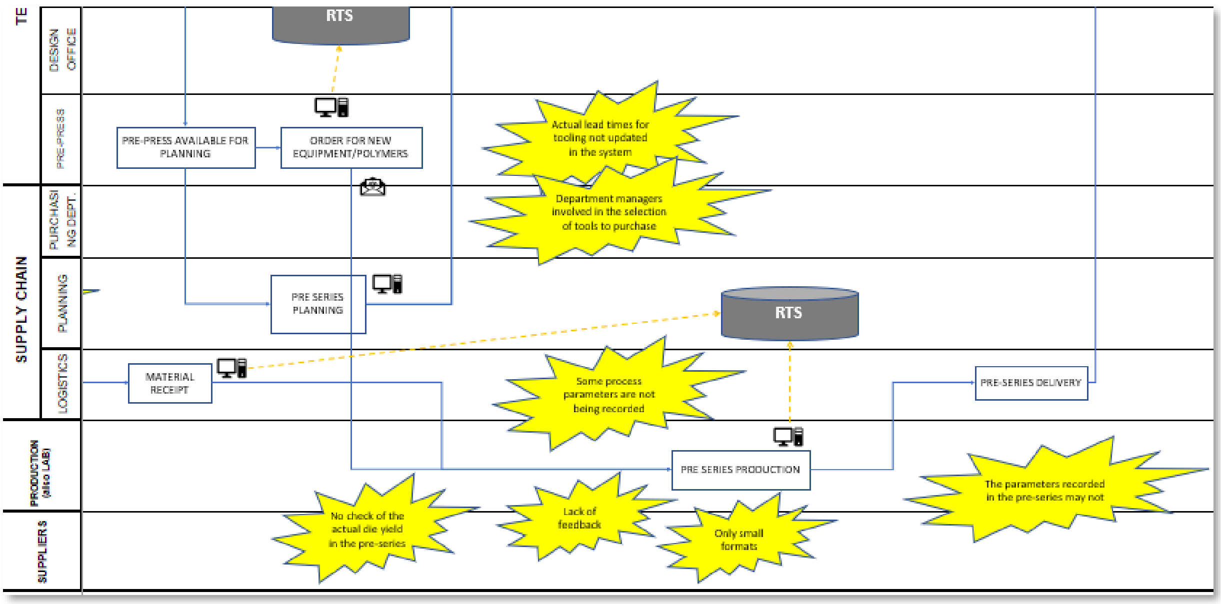

Figure 11 – Planning and production execution

Once approvals are obtained, the order is transferred to planning and subsequently released into production. The release in production is managed by the planning often lacking communication with the PMs. During the production process, technical changes may be required to obtain the desired standards of aesthetics and quality, but also for feasibility reasons. This is critical because in the production of luxury items the precision of colour and quality of finishing has strict boundaries. Such changes can include, for example, the need to use a different colour tone or type of paper compared to the original specifications of the job order to solve the technical problems encountered during the process of machine execution.

However, the changes made during the production process may not always be communicated to the project managers, and in the event that they are communicated, the actions required from the PMs (update the technical datasheet for example) may not be systematically managed. The information developed during the production process regarding how the job order was executed may remain within the production department alone.

This aspect is different from the management of the technical parameters of the machine. In fact, the technical parameters of the machine, such as temperature, pressure, ink amount, and UV lamp intensity are not systematically linked to the production order documentation and are not centralized in a structured database linked to the order. The operators thus mainly use physical sample sheets and locally stored machine parameters rather than standardized technical references integrated into the order documentation. This reduces the availability of standardized technical references for the execution of similar orders in the future.

It is important to note that the production department shows a high degree of operational flexibility, which make them able to compensate for incomplete or late information by rapidly reorganizing priorities or resolving the problem directly there. Although this high degree of flexibility helps to avoid immediate delays, it also hides underlying structural problems in upstream coordination.

3.1.2.4. Pre-series validation, quality control, and closure

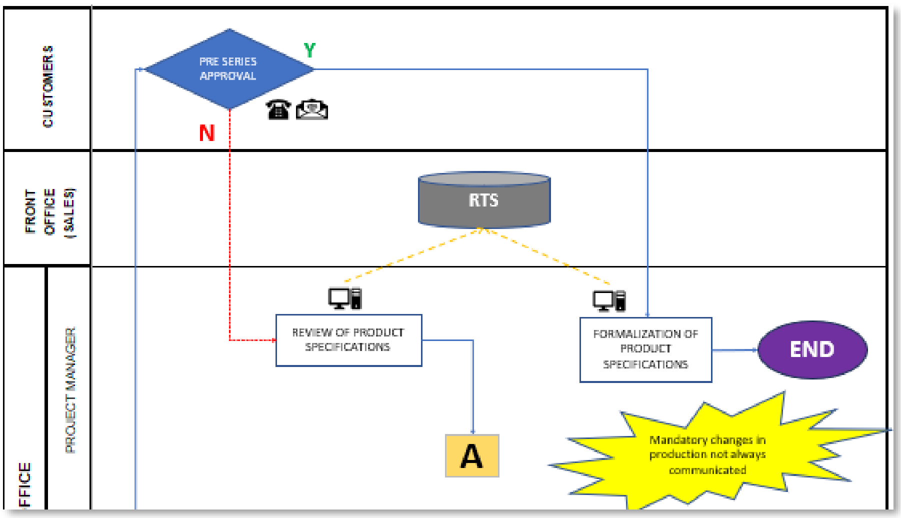

Figure 12 - Pre-series validation, quality control, and closure

In cases where a pre-series is necessary, the customer will validate the first batch of products before full production begins. If validated, specifications will be established, or else changes will be made.

Quality control is only done on the final product, ensuring conformity and integrity. However, a system of process quality control, which monitor both the process and the product, is not integrated throughout the different stages of production. In fact, the parameters of the process, as well as any deviations, are not monitored against a standard.

Lastly, closure of orders is not directly managed by the PM. In all cases, production and quality manage the closure of orders for each month, which creates a risk of information fragmentation and a lack of accountability throughout the full project lifecycle of PMs.

3.2. Target setting

According to the issues identified in the current state analysis, it is necessary to establish a target condition that is able to improve the transparency of the process, enhance operational governance, and monitor new orders throughout their lifecycle. The target condition does not propose any solution but rather establishes what the process will look like after overcoming structural issues.

A target condition is established by differentiating what is necessary (Must Have), which ensures a stable and governed process, and what would be desirable (Nice to Have), which would help improve the maturity of the process in the long term by introducing some possible value-added activities. They are summarized in Table 1 - Must have/Nice to have

3.2.1. Must Have: Core process governance and visibility

The first fundamental requirement is the provision of structured visibility on the status of new orders at all stages of their lifecycle. The process, therefore, needs to ensure that there is an unambiguous and consolidated view of the progress of the project, in order for the stakeholders[4] to be aware of the current status of the order without having to rely on fragmented personal tracking tools.

Secondly, the process must include a standardized monitoring system involving all relevant stakeholders. Monitoring activities should not be simply based on individual files but should be integrated into a shared tool that enables consistent monitoring of milestones and can improve the coordination between project managers, salesmen, and production.

Another important requirement is the development of a structure of feedback from the department managers of the different phases of the process. The information developed during the subsequent activities in the production process, must be communicated to avoid a situation where the next job order encounters the same problems.

Lastly, the process must ensure clear ownership of the process in the entire lifecycle of the order. Formal ownership has to be supported by the operation of mechanisms that facilitate effective supervision of the process to ensure effective project accountability.

3.2.2. Nice to Have: Fact-based management and knowledge retention

Besides the above-mentioned improvements in the field of governance, another desirable capability would be the establishment of a centralized fact-based database, with the support of systematic data gathering and the retention of knowledge. The machine parameters and settings should be increasingly included in structured documentation systems.

This would allow the establishment of a reliable technical baseline for future orders, eliminating the dependency on individual experience and establishing a baseline for the operators. Over time, it would support continuous improvement and enhance the ability of the organization to manage complexity in a structured manner.

[4] Production departments, plant manager, sales office, planning, logistic etc…

To achieve these objectives, the underlying causes of the inability to monitor, own, and integrate the information should be addressed. The next section of the paper would be dedicated to the root cause analysis of the critical issues identified.

	Must have	Nice to have
Visibility on the status of new orders	X	
Standardized monitoring system	X	
Feedback structure	X	
Clear ownership of the process	X	
Centralized fact-based database		X

Table 1 - Must have/Nice to have

3.3. Root cause analysis

3.3.1. Ishikawa diagram

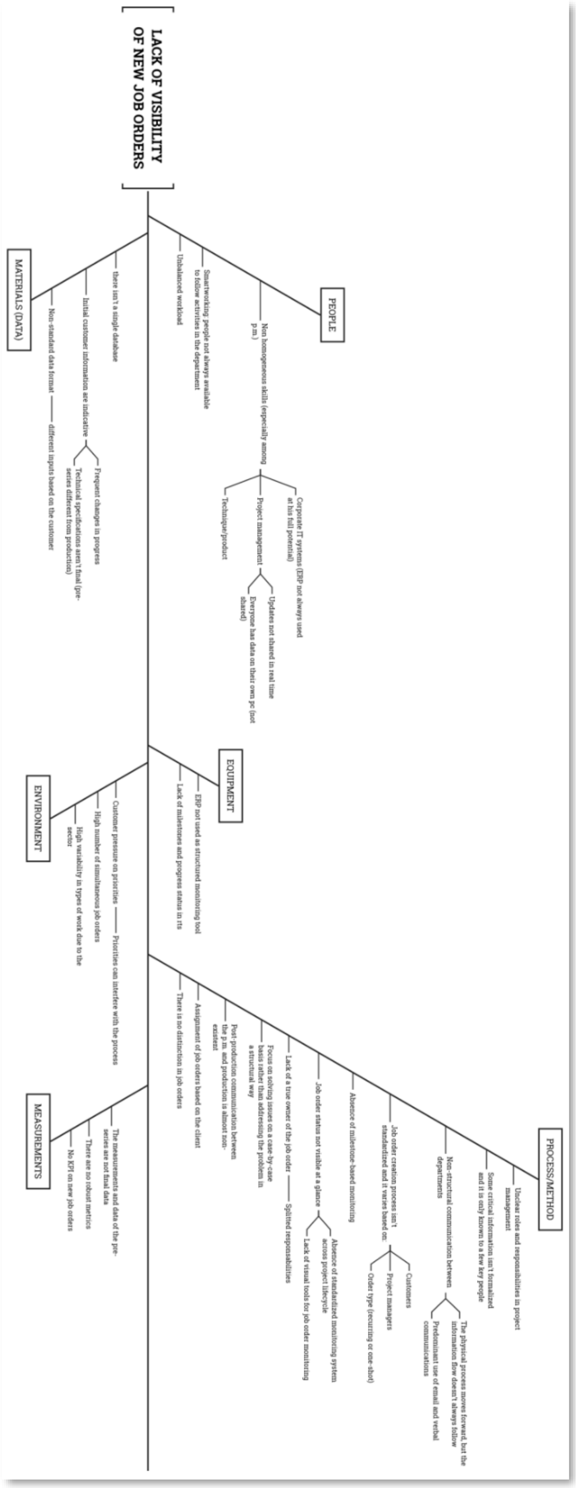

Figure 13 - Ishikawa diagram

A root cause analysis was conducted using the Ishikawa diagram (Figure 13) to identify the underlying causes of the identified issues. The analysis was done using direct observations of the process, internal interviews, and the current state map provided in the previous part of the paper (Figure 8).

The causes were identified using the standard analytical categories of the Ishikawa diagram: Process (Method), People, Equipment, Measurements, Environment, and Materials. Of these causes, the major cause was the Process (Method), which indicated the lack of process governance and monitoring.

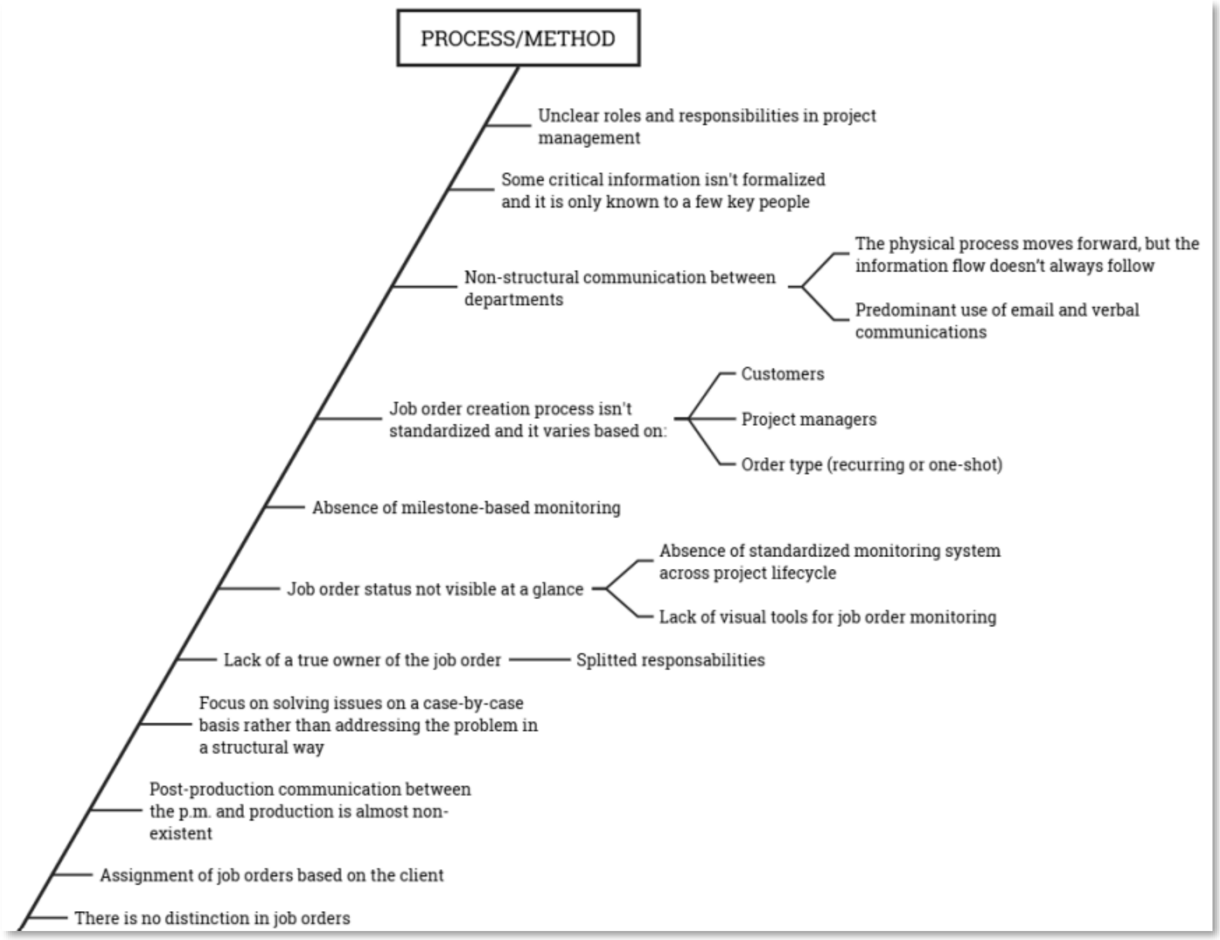

Figure 14 – Ishikawa diagram: process root causes

The analysis revealed that the current process does not have a standardized and centralized system of monitoring. The advancement of the project is monitored individually by tools handled by Project Managers, as opposed to an integrated system that allows for visibility. There is a lack of transparency within the phases of the process. It was understood that the absence of a centralized system of project tracking and the absence of visual management tools for job orders were two major causes of the lack of visibility. It was also revealed that, although an ERP system is used for order registration, it is not used as a structured tool that can be used to support project follow-up (equipment root cause - see Figure 13).

Another cause of the current situation is that there is no milestone-based system of monitoring. There are key steps within the process, but their completion is not monitored within a structured framework.

The analysis also revealed gaps in the implementation of operational ownership. Even though the project managers have the responsibility to manage the job orders, there are no specific mechanisms in place to ensure follow-up at all stages of the project. This happen because there is a split ownership, as different functions within the organization take up responsibility for project supervision (unclear roles).

The process also lacks a feedback integration mechanism. Changes to the production process, such as changes to materials or to colour configurations to reach high quality levels, are not structurally incorporated back into the project documentation. This creates difficulties in gaining insight into the actual execution of the order. It's important to underline that some critical information is available only to a few key people, making the process of feedback and sharing information more difficult.

In addition, the actual process parameters are not structurally incorporated into centralized documentation.

In conclusion, the Ishikawa diagram has verified the initial assumption that the absence of structural visibility of new job orders is essentially influenced by process-related root causes, as opposed to being influenced by human and technology-related factors. This is essentially the main structural limitation of the current system: the absence of a standard system of monitoring, feedback integration, and the implementation of process governance.

3.3.2. Critical issues identification

The analysis of the current state and the root cause analysis reveal a series of recurring structural weaknesses, particularly in terms of the reliability and visibility of the new orders development process. In fact, although the process flow is well defined, there isn't coordination between the different roles, information systems, and monitoring mechanisms. From the analysis of the observed practices, four main critical issues have been identified.

3.3.2.1. Missing coordination and information sharing

Although milestone steps have been formally established, there isn't a centralized and standardized system of monitoring the advancement of the project. The tracking of advancement is done individually by each PM through personal files[5], without a common dashboard or integrated performance indicators and retro planning tools are not integrated in a systematic follow-up system.

[5] Everyone has a different type of excel file

This means that any deviations in terms of planning and execution might not be detected until later stages of the process, which would limit the organization's capacity for managing risks and coordinating appropriate actions[6].

Furthermore, there is a limited information sharing especially between commercials and PMs, which causes an incomplete or wrong technical datasheet that will impact the production.

3.3.2.2. PM roles and responsibilities not clearly defined

The ownership of the project is formally assigned to PMs, but in real processes there is a lack of accountability for the entire lifecycle of the order. In particular, the lack of structured mechanisms to ensure the PM's active supervision until the production release might explain the heterogeneity in the intensity of the follow-up. In addition, some changes in the operations might not be managed within the PM's direct control, creating, in this way, a misalignment between formal responsibility and process governance.

This misalignment undermines the effectiveness of coordinated decision-making.

3.3.2.3. Absence of structured feedback

The current process does not have a formal mechanism in place for the systematic integration of the information obtained during production, especially with regard to the operational information. The changes from the technical datasheet that are made during the production process, for example, the ones that are made with regard to the material and the colour configuration that are required in order to achieve the aesthetic look that the client requires, are not formally communicated back to the PM or recorded in the order documentation. It can also happen that the job orders are not complete when they reach production and if there isn't a structured feedback system PMs are not aware of the problem and this is the cause for incomplete information the next time the same job order will be released in production.

3.3.2.4. Knowledge management

In addition, technical process parameters like temperature, pressure, ink amounts, and intensity of the UV lamp are locally recorded by the operators on sample sheets or stored in the machines' control systems where possible but are not systematically included with the documentation of the production order. As a result, technical knowledge developed during the production process is not fully consolidated at the technical process level and is still partially based on experience of the operator in production rather than standardized information.

[6] Because production does not know the state of the projects immediately

3.4. Development of countermeasures

3.4.1. Visual Planning System for monitoring new job orders

Considering the root cause identified in relation to the lack of a standardized and centralized monitoring system, a new system of visual planning and monitoring was put in place to ensure that there was structured visibility over the entire lifecycle of new job orders. The aim of this countermeasure was to transform project monitoring from an individual and decentralized practice to a transparent practice that was shared with all stakeholders.

The system was designed as a centralized visual planning dashboard that includes all information from all running projects, providing a live view of the advancement of projects. The Project Manager in charge of every project is responsible for updating the status of their own project through a dedicated interface for inputs[7], while the dashboard (Figure 15) is shared with the entire organization in read-only mode for all other functions, such as production, sales office, and management. The dashboard can update itself using queries on excel.

ID PROGETTO	DESCRIZIONE 1	DESCRIZIONE 2	CODICE CLIENTE	NR PEZZI	COMMESSA	STATO COMMESSA
GB-2026-01	[redacted]	[redacted]	15123534215	100456	45678901	APERTA
GB-2026-02	[redacted]	[redacted]	15148936922	2367	50863201	APERTA
GB-2026-03	[redacted]	[redacted]	15123534215	24560	50558701	APERTA
GB-2026-04	[redacted]	[redacted]	15123534215	10000	0	DA INSERIRE
GB-2026-05	[redacted]	[redacted]	15113698257	2900	0	DA INSERIRE
GB-2026-06	0	0	0	0	0	CHIUSA

PROGETTAZIONE	ARTWORK	MATERIALE ORDINATO	TOOLING	BAT	BAT CLIENTE	PRESERIE	PRODUZIONE
IN PROGETTAZIONE	ARRIVATO	RITARDO	RITARDO	N/A	NOK	NOK	NOK
IN APPROVAZIONE	APPROVATO	ON TIME	ON TIME	OK	OK	OK	NOK
APPROVATO	DA LAVORARE	ON TIME	RITARDO	NOK	N/A	OK	NOK
IN PROGETTAZIONE	INVIATO	NON ORDINATO	NON ORDINATO	N/A	N/A	N/A	N/A
IN PROGETTAZIONE	IN ATTESA	NON ORDINATO	NON ORDINATO	N/A	N/A	N/A	N/A
0	0	NON ORDINATO	NON ORDINATO	N/A	N/A	N/A	N/A

Figure 15 – Example of dashboard

The visual planning system facilitates the monitoring of the entire lifecycle of the projects by using structured milestones corresponding to the operational process. These milestones involve the creation of the project, technical development, artwork approval, the availability of materials, the readiness of tools, customer approval phases (BAT[8]), pre-series execution, and the release for production. In all these milestones, the

[7] Each project manager has an excel sheet to fill in

[8] BAT is a color test in the department (offset) with the client present to validate the product before the actual batch production takes place

planned and actual completion dates are recorded for immediate detection of any delay or deviation.

A visual status logic using a set of colour codes was developed to make the process more readable and to facilitate faster interpretation. The milestones are automatically highlighted according to the status relative to the planned deadline making easier to other departments to identify critical situations immediately. For example, in Figure 15 in the first row the actual date of the order of materials was delayed compared to the planned one, so the cell is coloured in red making clear to everyone that we have to be careful about that job order because the delay is impacting also the final date of production.

The system also promotes the concept of operational ownership by directly holding the project manager accountable for the accuracy and updating of the data, that will be represented on the dashboard. Moreover, the system will promote better coordination between project management and production activities. This will be achieved by giving production a heads-up on the upcoming pre-series and production releases, which will be provided by the system. This will help in reducing uncertainties regarding the incoming projects in production.

3.4.2. Introduction of Strategic Meetings

A structured system of strategic meetings was implemented to effectively deal with the root causes related to low operational ownership, inadequate cross-functional alignment and incomplete information. The aim of this countermeasure was to put in action coordination mechanisms in the process, which would ensure information sharing, enhance Project Manager ownership, and increase the identification of possible issues in the project lifecycle.

In the past, the coordination of the commercial, technical, and production departments was based on informal communication. The absence of a structured system of interactions resulted in inadequate information sharing, low visibility of project readiness, and inconsistent enforcement of project ownership.

Three strategic meetings were incorporated in the project/job order lifecycle.

3.4.2.1. Pipeline Meeting for New Projects

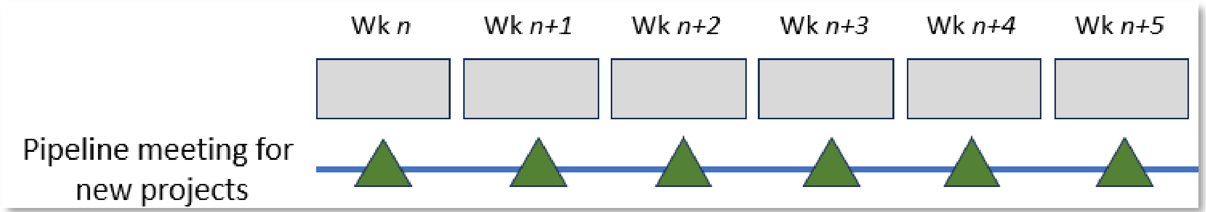

Figure 16 – Pipeline meeting for new projects schedule

A weekly pipeline meeting (Figure 16) was implemented to monitor projects at the quotation and early stages of development phases. This meeting is coordinated by the Sales Manager and Head of Technical Office and includes participation from the commercial team, corresponding project managers, the Operations Manager, and the Plant Manager.

The primary objective of this countermeasure is to ensure proper coordination between the commercial and technical teams at the early stages of project development. During this meeting, project briefs are discussed, and relevant information on project scope, volumes, timelines, and customer requirements is shared. This ensures that the visual planning is update at the actual state.

This form of interaction also guarantees the direct involvement of Project Managers in the early stages of project development. This, in turn, prevents commercial activities from moving forward without the correct alignment in terms of project implementation.

In addition, the involvement of plant manager helps to ensure early identification of potential feasibility issues even if at this stage is not easy to detect all the possible problems and also, they can evaluate the production implications in a fast and predictive way.

The pipeline meeting also helps to introduce a review of project outcomes. This includes the evaluation of won or lost projects. This helps to evaluate the success rate of projects and to learn more about the factors affecting project acquisition (costs, quality, timing …).

3.4.2.2. New project Kick-off Meeting

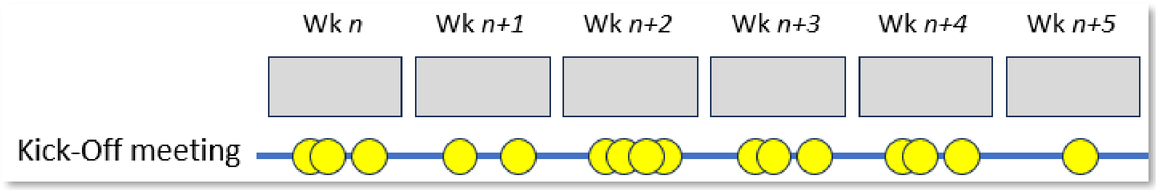

Figure 17 - Kick-off meeting schedule

The concept of a new project kick-off meeting (**Error! Reference source not found.**) was also introduced with the aim of promoting communication during the beginning of every new project that the customers have assigned to us (after the quotation process). This meeting is usually led by the Project Manager and includes production supervisors, planning, and quality departments.

The goal of this countermeasure is to communicate all relevant information regarding the project to the production team before the actual execution of the project begins. The relevant information shared during the meeting includes the technical specifications of the project, the customer requirements, and the volume and characteristics of the process.

Such a structured form of communication ensures that the production team is provided with all the necessary information before they begin the production process. It is also a chance for the production team to provide to PMs potential concerns and give them feedback on the technical or operational feasibility.

By formalizing this communication process, the meeting enhances the transparency of the process and ensures all stakeholders have a common understanding of the process requirements.

3.4.2.3. Industrialization Meeting

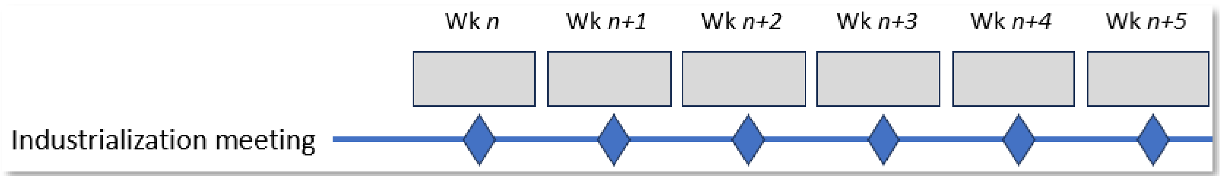

Figure 18 – Industrialization meeting schedule

The introduction of a weekly meeting on industrialization (Figure 18) was aimed at tracking projects that are about to enter the production execution phase. This action focuses on pre-series and production activities planned in the following two weeks. The meeting is headed by the Head of the Technical Office. It also includes PMs, the plant manager, supervisors of all production departments, planning, quality supervisor, and a person from purchasing department.

The main aim of the countermeasure is to ensure that all conditions of technical and operational readiness have been met before the project is released for production. During the meeting, each project is reviewed in terms of the availability of materials, the status of the tooling, artwork approval and production readiness (by referring to the progress statuses of visual planning).

This process of structured review will help to identify potential problems associated with materials, equipment, technical specifications, or scheduling constraints. In this way, corrective actions can be defined before the problems arise.

Finally, the meeting for the industrialization phase reinforces the importance of the Project Manager as a central point for the coordination of the project, ensuring the active supervision of the transition from the technical development phase to the execution phase. In this meeting the visual planning will be crucial to track in real time all the possible delays and problems.

3.4.3. PM-New Job Description

The aim of this countermeasure was to formally establish the Project Manager as the accountable owner of every job order, thereby facilitating structured supervision, coordination, and continuity throughout all process phases.

Prior to the implementation of this countermeasure, while the Project Managers were formally linked to job orders, their roles were not consistently defined or operationally enforced. In effect, project supervision was largely left to individual initiative, instead, the Job Description for the Project Manager role introduced and reinforced a standardized formalization throughout the entire project lifecycle.

The key responsibilities assigned to the Project Manager are:

- Project initiation and order formalization: The Project Manager is responsible for initiating the project within the ERP system by registering the customer order, preparing the technical specification sheet, and opening the production order. These actions guarantee that each project is formally defined, traceable, and integrated into the operational workflow from the very beginning[9].
- Coordination of technical and operational activities: The Project Manager is responsible for all activities necessary to prepare the project for production, which include internal communication, order for procurement of materials, and the technical specifications of the project and if there is a lack of information, he has the duty to search for a solution. This ensures that all project information is properly defined.
- Management of the client validation phases: The Project Manager is responsible for the management of processes related to customer validation, which include colour validation (Bon A Tirer), artwork approval, print test verification, etc. This ensures that all customer requirements are properly understood, validated, and incorporated in the specifications.
- Monitoring of project advancement and production readiness: The Project Manager monitors the progress of the job order through all the phases of the lifecycle. This ensures that all the requirements in terms of technical and organizational aspects are properly met before the release of the project. This includes ensuring that the planning and production processes are properly matched with the requirements of the project.
- Support to production and supervision during execution: The Project Manager can offer technical and organizational support in the different phases of production, as necessary, to ensure the proper implementation of the project specifications and the continuity between the technical preparation and execution of the production and, if necessary, he has to update the technical datasheet at the end of production in order to prevent future problems.

By clearly establishing these roles, the Job Description has clearly defined the Project Manager as the responsible owner of each job order. Formalizing these roles has eliminated the need for decentralized management systems.

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[9] It is also important that the PMs register the projects in the Visual Planning

From the process perspective, the countermeasure directly addresses the root cause of integrating ownership accountability within the process structure. The Project Manager is no longer associated with the project but is now formally accountable for the monitoring and successful execution of the project.

3.4.4. New role: Process quality assurance

To deal with the underlying causes related to the lack of structured feedback integration, as well as the issue of the lack of quality control at the process level, a new role was introduced in the organization, named Process Quality Assurance (PQA). The aim of this countermeasure was to ensure the monitoring of production processes, manage process non-conformities in a structured way, and ensure the integration of operational feedback into the project management process in a formal way.

In fact, prior to the implementation of this countermeasure, quality control activities were mainly centred on the aesthetic of the final product without any structured supervision of process execution or formal feedback integration into project documentation. In this way, operational deviations and process-related issues were not managed in a systematic way.

The implementation of the PQA role introduced a quality supervision function at the process level with clear responsibilities.

PQA - STANDARD WORK CONTROLLO OFFSET

Numero Commessa	
Nome Operatore	
Data	
Ora	
Fase di produzione	
Tiratura	

		SI	NO	N/A
1	La Panoplie è disponibile			
2	Se non è disponibile la panoplie è presente il foglio campione correttamente compilato?			
3	Se non è disponibile ne foglio campione ne panoplie è stata segnalata la NC sul modulo?			
4	Se alla domanda 2 la risposta è NO, cosa stanno usando come riferimento? (note)			
5	Se è presente il foglio campione, lo stesso è compilato e approvato?			
6	Il modulo 300 è compilato in tutte le sue parti considerando la fase attuale?			
7	Se alla domanda 6 la risposta è NO, hai fornito un feedback immediato all'operatore?			
8	Se ci sono state anomalie sono correttamente riportate sul foglio e sulla board?			
9	Hai eseguito un controllo visivo incrociato della produzione in corso?			
10	Se hai riscontrato un difetto non rilevato, hai dato un feedback immediato al macchinista?			
11	Il macchinista ha segnato correttamente il difetto sul bancale?			
12	Se il difetto persiste informa il CAPO REPARTO.			
13	Note:			

Figure 19 – PQA checklist for offset department

The specific responsibilities of the Process Quality Assurance role include:

- Verification of production execution and operator control activities: The PQA role is responsible for verifying whether the production operators execute the processes in accordance with the standard control procedures. This involves verifying the availability of reference materials, sample sheets, ensuring that the operators complete the production control documentation correctly, and carrying out independent cross-checks on the production output. This role ensures that the processes are being executed correctly, with operators being responsible for the execution of the processes.

- Quality verification of incoming material: The PQA is responsible for carrying out the quality verification of the incoming raw materials. This involves carrying out technical validation tests to ensure that the materials being used for the processes meet the required standards. This ensures that the processes begin with the required standards, with no deviations in the processes.
- Structured management of process non-conformities: The PQA is responsible for the formal recording of the identified non-conformities that arise during the production process. It includes deviations in the processes, technical changes, and operational changes. The NC must be written by operators on visual management boards that were introduced and located in all the production departments and then the PQA registers them.
- Ensuring feedback integration into the project management process: The PQA ensures that the non-conformities are communicated to the responsible Project Manager or the other actors involved. This ensures the formal integration of the operational knowledge gained from the production process into the project management process (Note: PQA is not responsible for the reporting but to ensure the actors involved communicate with each other to resolve the NC).

	Non Conformità	Resp. Gestione NC	Azione correttiva
1	Codice Carta diverso da quello in commessa	PM	Correggere codice nella scheda tecnica
2	Codice INK/VERNICE diverso da quello in commessa	PM	Correggere codice nella scheda tecnica
3	Assenza allegati di commessa (pellicola, ciano, scomposizione, ...)	PRE-STAMPA	Stampa degli allegati mancanti
4	Incoerenza tra gli allegati di commessa	PRE-STAMPA	Verifica e ristampa degli allegati sbagliati
5	FOGLIO CAMPIONE - mancanza etichetta	Qualità	Creazione etichetta e apposizione sul FOGLIO CAMPIONE al termine delle commessa
6	Mancanza FOGLIO CAMPIONE	Qualità/PM	Creare FOGLIO CAMPIONE al termine delle commessa
8	Informazioni in commessa incomplete	PM	Recuperare informazioni / sospendere la produzione
9	Materia prima / semilavorato difettoso	Qualità	per carta che spolvera passaggio a vuoto / primer + correttiva con fornitore
10	Polimero MANCANTE o USURATO	Reparto	Richiesta ordine POLIMERO a PRE-STAMPA
11	Lastre ERRATE o DIFETTOSE	PRE-STAMPA	Richiesta nuove lastre a PRE-STAMPA
12	Correzione COLORE in macchina	PM	Valutare se mantenere la modifica anche per le prossime ristampe
13	Sottotiratura	Customer Service/PM	Rilanciare una commessa di ripiego
14	Numero COLORI/ VERNICE/PASSAGGI / PRIMER diverso da commessa	PM	Comunicazione all'UT - se necessario modifica scheda tecnica

Figure 20 – Some of the NC's content present on the visual boards in offset

By introducing a dedicated role responsible for process-level quality supervision and feedback integration, this countermeasure establishes a structured feedback loop between production and project management. This directly addresses the root cause related to the absence of structured mechanisms for capturing and integrating operational feedback.

Rather than waiting to identify problems only when the production process has been completed, the organization can now monitor the conditions of the processes in real-time and ensure that any problems that arise are properly addressed and communicated.

In addition, the utilization of visual management boards to track non-conformities helps to develop a clearer process and ensures that there is a level of accountability within the processes. Every issue that arises is formally assigned and worked until reaching a solution, minimizing the likelihood of recurring problems and improving the reliability of the processes.

In conclusion, the establishment of the Process Quality Assurance function has significantly improved the process control and feedback integration processes and has contributed to the development of a more structured and knowledge-based approach to the management of the production processes.

3.4.5. Process parameters management and knowledge integration

The goal of this countermeasure is to allow for the progressive development of a technical knowledge base that could support potential production activities by providing reference conditions for similar job orders.

Prior to this countermeasure, the machine parameters used during production, such as temperature, pressure, and production speed, were not recorded in a centralized, structured way. Although local data was available on the sample sheets used by the operators or inside the machines system (where possible), this data was not available in a way that could be analysed (for example in a database). This meant that machine setup activities were based on the experience of the operators.

The process we have developed allows us to easily capture the necessary process parameters for the hot stamping process[10] in an organized file, with these goals in mind:

- Record production parameters by job order: We can capture all relevant technical information (initial temperatures, working temperatures, pressures, machine settings, and production rates), assigning it to number of job orders, customer codes, or product information. This ensures that we can retrieve all information regarding a particular process that we have completed in the past, in relation to the same (or a similar) job order in the future.
- Develop a "go-to" set of baseline conditions for similar job orders: By relating our process parameters to particular products, machines and process settings, we can develop a "go-to" set of conditions that can be used to avoid trial and error in setting up our process for new job orders (reducing setup time).
- Monitoring of setup time and production performance indicators: Aggregate-level analyses of the data using various statistical tools like pivot tables (Table 2 – Avg setup time in hot stamping machines) enable the calculation of the average time taken to set up the machine and the production speed. Such analyses

[10] It was chosen by the top manager to start collecting parameters from the hot stamping department

are useful in the ongoing monitoring of production processes and identifying areas of improvement.

Machine name	Average setup time (h)
22	2:12
23	2:06
24	2:36
25	1:59
26	1:47

Table 2 – Avg setup time in hot stamping machines during the internship

- Documentation of technical issues and process deviations – The system also helps in the documentation of various issues and problems that are encountered during the production process. Such documentation helps in establishing correlations between the processes and the problems (linking these problems to the correct NC).

This countermeasure represents the first step in the development of a structured process knowledge management system. This system will allow the organization to gradually improve the consistency of the processes, as well as reduce the variability in production setup activities (the medium-long term objective is to reduce the setup time), by transforming the unstructured, experiential knowledge that has existed in the organization into a more structured, accessible, and usable form of information. Although the system is still in the early stages of implementation, it has the potential for integrating technical knowledge into project preparation and production planning activities in the future.

3.5. Implementation plan and TO-BE scenario

3.5.1. Implementation plan

The implementation of the countermeasures that have been identified has been carried out gradually, from the initial problem inquiry phase to pilot implementation, organization alignment, and finally full-scale implementation. This has ensured that each countermeasure has been developed with reference to the needs that were identified in the organization.

The implementation phase began in November 2025 (Figure 21), with the initial analysis phase being carried out through a series of structured interviews with key stakeholders within the organization. This phase aim to clarify the dynamics of new job order management within the organization. Based on what I found from this initial questioning phase, the major root causes related to the lack of structured visibility and ownership were identified and it was clear that they had a negative impact on the process.

After the identification of the underlying causes, a structured visual planning system was developed. In the month of November 2025, the visual planning tool was developed progressively through direct collaboration with a pilot group of three Project Managers. This helped to enhance the visual planning system through an iterative process while aligning the requirements of the users of the tool.

In addition to the visual planning system's development, an initial process parameter collection system was also introduced. Starting from November 2025, the technical parameters relevant to the hot stamping process were documented progressively. This helped to lay the foundation for the future integration of technical knowledge into the project management and production preparation processes.

In December 2025, further countermeasures were developed to support the process of governance and improve the visual planning system's effectiveness. In this period, it was introduced the design of strategic meetings that would be implemented (as a pilot) into the business process the next weeks.

Significant acceleration of the implementation process was achieved during the Kaizen event that took place at the end of January 2026. This event involved the participation of various departments and helped identifying the structural process limitations, especially focusing on feedback integration and the reinforcement of ownership. During this phase of the implementation process, various countermeasures were formally introduced into the business process.

The visual planning system was adopted as the baseline project monitoring tool for the organization. The strategic meetings were formally defined and integrated into the organization's operational workflow. Moreover, the formal Job Description for the Project Manager position was developed and implemented to enhance the accountability of the ownership of the job orders.

Within the context of the Kaizen event, we identified the need for a structured quality supervision at the process level. Accordingly, the Process Quality Assurance (PQA) role was defined. After further refinement of the operational process and the development of the relevant tools like checklists and non-conformity management lists, the PQA role was instituted in February 2026 and have still to be validated.

The implementation process was conducted in an iterative manner; this secured that the countermeasures that were deployed were appropriate for the needs, had the support of the organization's stakeholders, and were successfully integrated into the existing structure of the process.

The overall implementation timeline is illustrated in Figure 21, which highlights the major stages of development of the countermeasures.

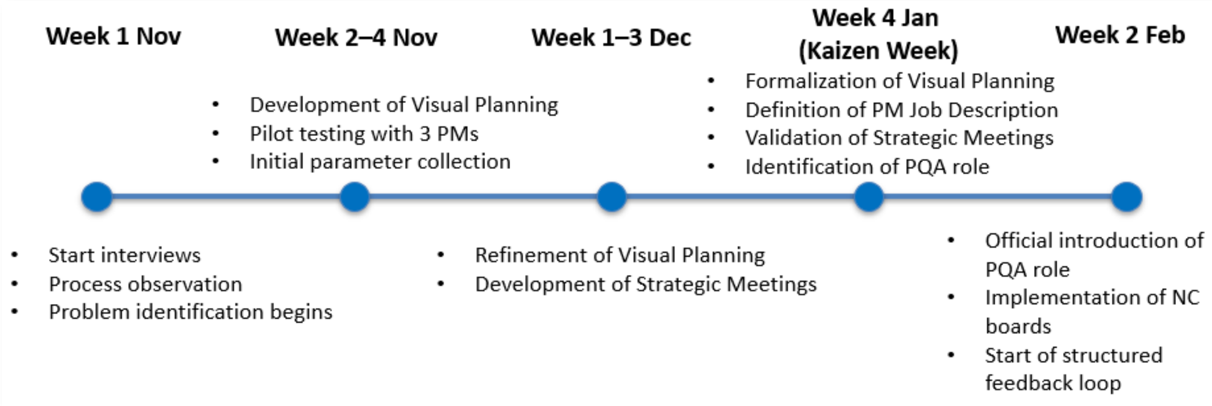

Figure 21 – Implementation timeline

3.5.2. TO-BE process map

The TO BE process map shows the redesigned job order management process that is expected after the implementation of the countermeasures that were identified. The aim of the process redesign is to address the structural issues that were identified from the analysis of the current state of the process, while incorporating the mechanisms of monitoring, coordination, and accountability of the ownership of the process. The future state of the process will involve the addition of new points that can enhance the process visibility.

In the TO-BE map there hasn't been a change in the process from the flow perspective, but an effort has been made to keep it as similar as possible while trying to clarify and solve all the problematic points, such as the overlap of roles between the PMs and the salesmen or the lack of feedback.

In Figure 22 the clouds that are coloured in green are the problems that have been solved thanks to the countermeasures implemented and also the ones that should be solved in the nearly future with next implementations.

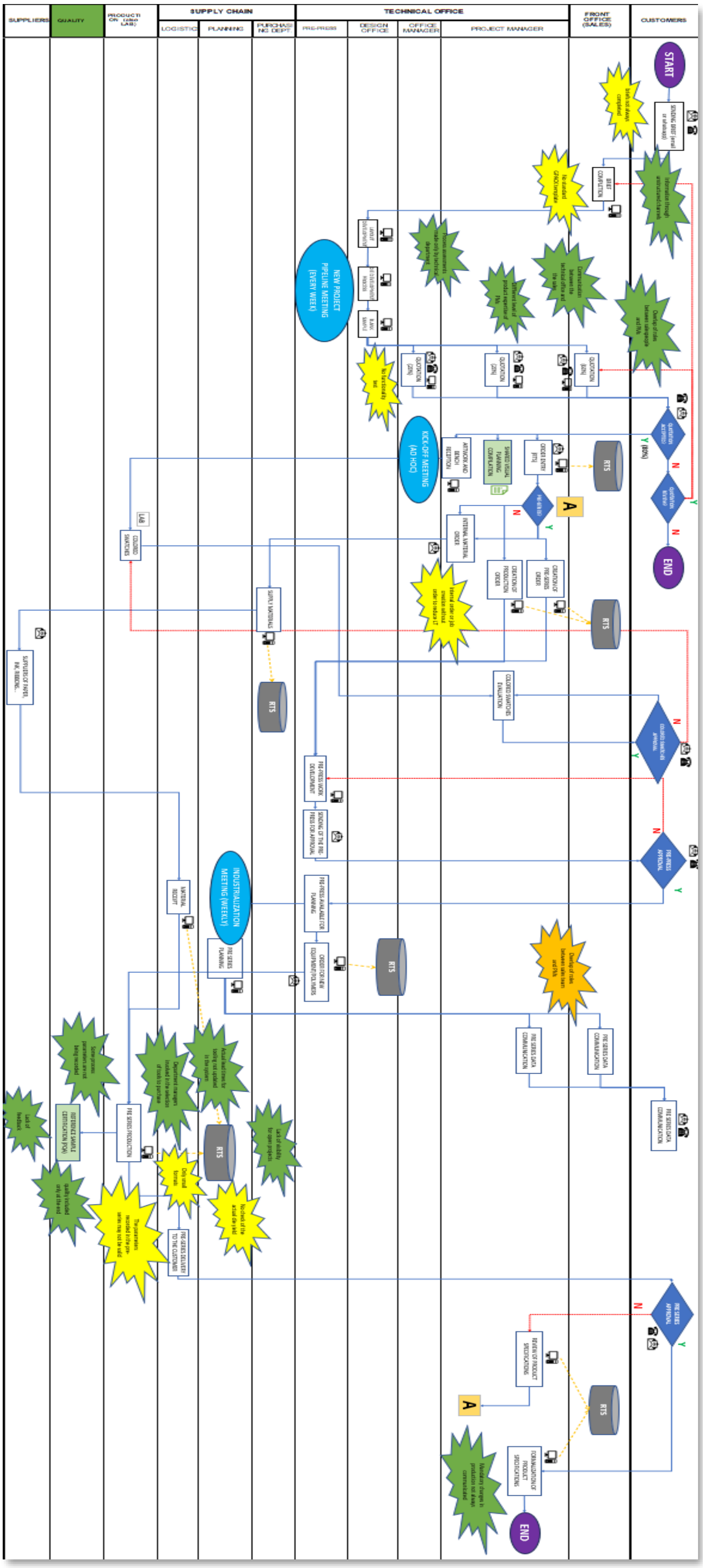

Figure 22 - Future state map

3.5.2.1. Integration of Visual Planning and structured process monitoring

One of the most important improvements that the TO-BE process has introduced is the integration of the Visual Planning system (Figure 23 – Visual planning in the flowFigure 23). At the same time of the order entry and the creation of the project in the ERP system (RTS), the Project Manager must register the created project in the tool. This marks the activation of the structured monitoring of the process, highlighting the responsibility of the Project Manager for the supervision of the project from the early stages of its lifecycle until its completion.

The integration of the Visual Planning system has replaced the traditional approach of using various methods of tracking the project's progression at different levels of the organization. This has provided a common reference framework for the monitoring of the advancement of the project, thus making the information related to the project accessible and transparent across the organization, reducing the ambiguity of the project's status.

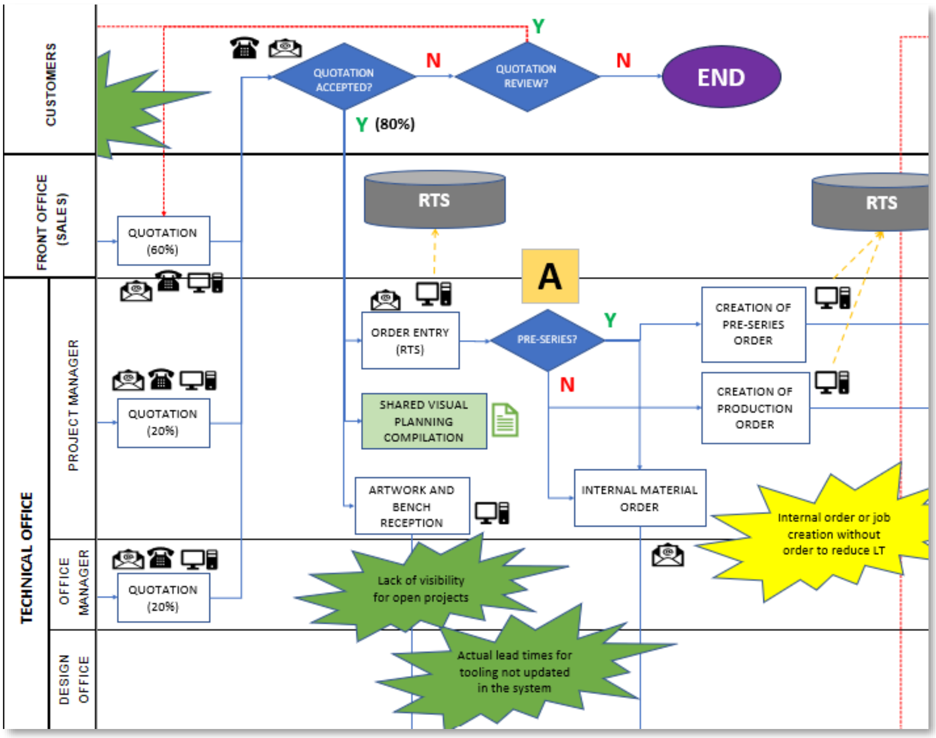

Figure 23 – Visual planning in the flow

3.5.2.2. Introduction of structured strategic meetings

The TO-BE process has three formalized strategic meetings strategically positioned in the project lifecycle to provide structured communication, proactive coordination, and ownership enforcement.

The Job Pipeline Meeting, which occurs during the quotation/project acquisition phase of the project lifecycle, provides early alignment of commercial, technical, and operational functions. It ensures that new project opportunities are collectively reviewed, allowing early identification of possible operational constraints.

After acquisition of the project by the project team and formalization of the order, a Kick-off Meeting takes place under the responsibility of the Project Manager. This marks the official handover of ownership of the project. The stakeholders are informed of all specifications, technical aspects, and production constraints of the project. This process of information sharing ensures that no information is lost along the way. Moreover, it enhances the responsibility of the Project Manager.

Lastly, the Industrialization Meeting takes place before production execution. The meeting ensures that all necessary conditions are met before production.

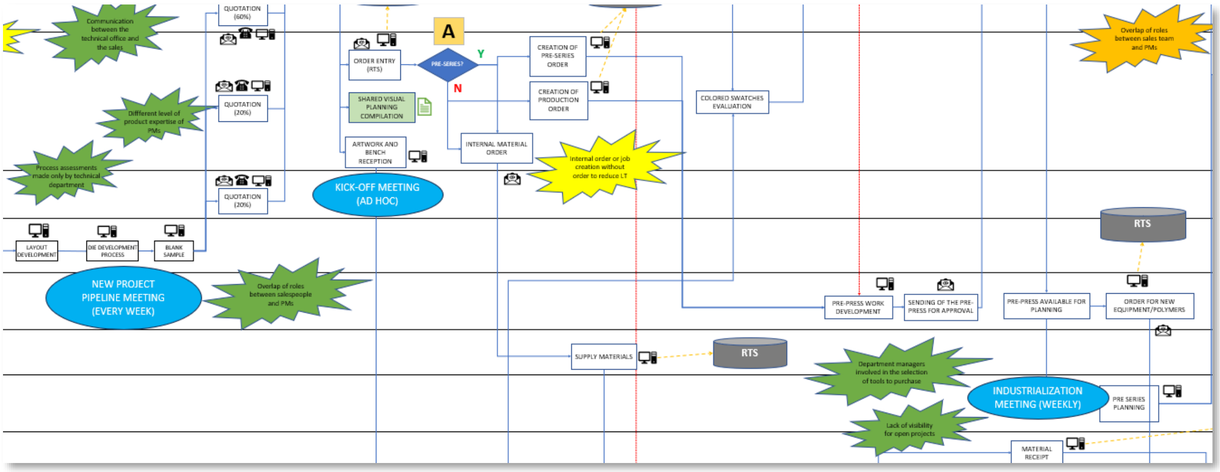

Figure 24 – Strategic meetings in the flow

3.5.2.3. Integration of Process Quality Assurance and structured feedback loop

Another important change brought by the TO-BE process is related to the incorporation of the Process Quality Assurance (Figure 25), a function that will be included in the production phase. The PQA function is specifically designed for monitoring the execution of the production process, assessing its conformity, and dealing with nonconformities through recording and follow-up procedures.

The PQA function will ensure that information related to deviations and issues experienced during the production process is adequately recorded and communicated back to relevant stakeholders, including the Project Manager, where needed.

This approach will specifically address one of the issues related to the lack of a structured feedback integration, which was previously highlighted, and will contribute to a better development of a controlled production process.

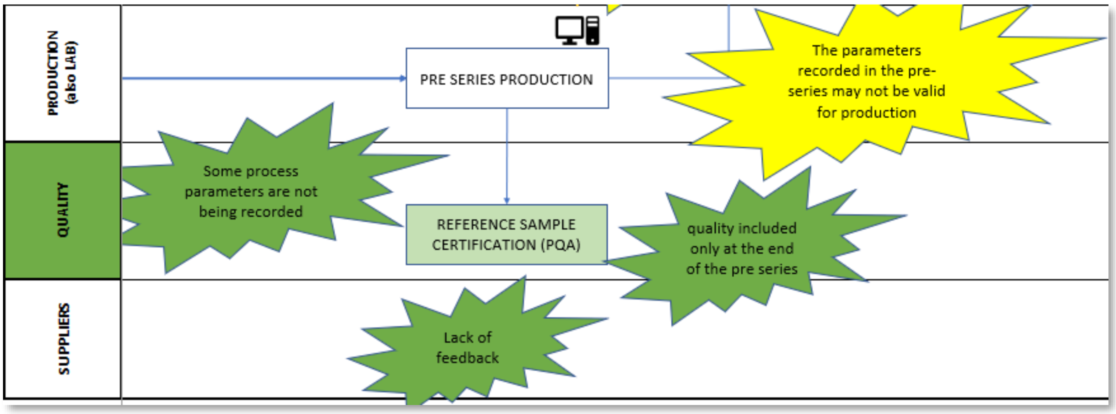

Figure 25 – PQA in the production flow

The TO-BE process, therefore, represents a significant improvement from the existing process from the perspectives of stability, transparency, and control.

3.5.3. Standardization and new procedures

The last phase of the improvement initiative was dedicated to the standardization of the countermeasures that were previously implemented. Standardization can be regarded as one of the most important phases of process improvement, as it allows for the establishment of stability within the organization, creating a new framework of reference for all future activities.

After the implementation phase, it was decided to incorporate monitoring and coordination activities into the management process of the improvement project. Specifically, the Visual Planning system was adopted as the standard tool for monitoring all new job orders. The application of the Visual Planning system is now required for all new projects, providing a unified framework of reference for all activities related to the monitoring of new projects.

At the same time, the structured meeting processes developed during the implementation phase are now an integral part of day-to-day process workflow. These meetings are now an official process of coordination, allowing for better linkage between the involved processes at various stages of project development. This has also contributed to better process predictability by limiting reliance on informal communication.

The formalization of Project Manager roles has also enhanced process governance and has clarified ownership at various stages of project development. This has ensured better continuity in process supervision.

Another step toward the consolidation of practices in feedback integration management is represented by the introduction of process-level quality supervision. The newly created Process Quality Assurance role is helpful in recording and managing of any deviations in the processes. Although some of the supporting tools are still under validation, this function has already introduced a systematic way of managing feedback that enhance continuous improvement.

Finally, initial practices with regard to the structured collection of technical process data have been established. Although limited in scope, these processes represent the beginning of the progressive incorporation of technical knowledge within the processes of preparation and execution.

Overall, the standardization processes outlined above have transformed the project management process into a much more structured system of control. The incorporation of monitoring, coordination, and feedback processes within the operational processes has established an operational baseline, thus ensuring the sustainability of the improvement processes.

The standardization framework established has provided the baseline on which future continuous improvement processes will be based.

3.5.4. Critical aspects

Despite the major organizational improvements that have been realized from the implementation of the countermeasures, some limitations exist that need to be addressed to ensure the long-term robustness and effectiveness of the redesigned process.

3.5.4.1. Dependence on manual updates in the Visual Planning system

The reliability of the centralized monitoring system is heavily dependent on the manual data entry and the update carried out by Project Managers. Even though the system offers an improved visibility and tracking capabilities, its accuracy and reliability are dependent on the correctness and timeliness of manual inputs.

The system's reliance on manual update creates some risks that could affect the entry of data in an incomplete, delayed, and/or inconsistent manner. The system's reliance on operational routines and the discipline of individuals creates some limitations that could affect the sustainability of the system in the long term.

3.5.4.2. Lack of integration between monitoring tool and ERP system

Another relevant limitation concerns the lack of integration between the monitoring system and the company's ERP platform. Currently, project data must be managed across separate systems, requiring manual alignment between the two tools.

This separation increases the risk of data misalignment and limits the ability to fully automate project tracking and supervision activities. It also prevents the establishment of a fully integrated and automated information flow, which would further improve process reliability and efficiency.

3.5.4.3. Ongoing validation of the Process Quality Assurance role

Another key point to be taken into account is related to the Process Quality Assurance role, still in a phase of consolidation. Although this element has already had a positive impact on the ability to capture production-related issues, its operational procedures are still in a phase of stabilization. The effectiveness of this role will be related to the stabilization process.

3.5.4.4. Limited integration of technical parameters

Initial efforts have been made to collect technical process parameters during production activities with the objective of facilitating structured knowledge integration. However, currently, this activity is limited in scope and not fully embedded as an operational activity.

The collection of technical parameters is not systematically executed by production personnel. The collected technical parameters are not integrated into a system that can be easily accessed for later reference, and the technical knowledge is not utilized to support process preparation.

Additionally, the absence of a structured system for storing and managing technical process parameters in a centralized manner limits the support that can be offered in the preparation of the processes.

3.6. Results monitoring

3.6.1. Organizational impacts

From the qualitative findings from the previous section, we undertook a structured review of the impact on the organization. This involved a comparison of the original AS-IS situation and the new TO-BE situation after the countermeasures implemented.

The evaluation focuses on the main process dimensions affected by the improvement initiative, namely process visibility, ownership and accountability, cross-functional coordination, feedback integration, and technical knowledge continuity.

A process maturity scale was adopted to provide a clear and structured representation of the improvements. This scale reflects the degree of formalization, visibility, and integration of each process dimension, allowing a direct comparison between the initial and current states, it was stated through interviews with the actors involved and with the management and through direct observation of the new processes. The objective of this assessment is not to provide absolute performance measurements, but rather to illustrate the structural evolution of the process and the organizational impact of the implemented solutions.

The results of this assessment are summarized in Table 3 – .

	AS-IS CONDITION	TO-BE CONDITION	ORGANIZATIONAL IMPACTS	MATURITY LEVEL
PROCESS VISIBILITY	No centralized monitoring, personal tracking files, limited awareness of project status by other stakeholders	Implementation of Visual planning system for the PMs accessible also to other stakeholders in read-only mode	Improved transparency and process visibility enabling better coordination, improved planning accuracy and reduced uncertainty	From 0% to 90% (no visibility to centralized visibility) **ACHIEVED**
OWNERSHIP	Formally assigned to PMs but not exercised because of lack of monitoring tools and unclear responsibilities	Clear assignment of responsibilities (planning and job description), structured meetings	Increased accountability and real ownership, there is more project supervision along all the phases	From 40% to 100% (formal ownership to operational ownership) **ACHIEVED**
COORDINATION	Communication between PMs and other departments mainly informal and sometimes overlap of roles	Structured coordination meetings and visual planning that enables alignment between departments and offices	Improved synchronization across functions, earlier detection of possible issues, more stable and predictable production planning	From 30% to 90% (informal communication to structured coordination) **ACHIEVED**
FEEDBACK INTEGRATION	Deviations not consistently communicated by dep. supervisors or integrated by PMs in the technical datasheet (informal communication)	Structured feedback mechanism supervised by the PQA and introduction of management of non-conformities	Improved consistency of feedback, enabled a more rapid and effective resolution of issues, improved process control during production	From 40% to 80% (inconsistent feedback process to a structured one **ACHIEVED**
TECHNICAL KNOWLEDGE	Technical parameters never collected in a centralized system; operators rely on experience (and accuracy of sample sheets)	Initial structured collection of process parameters	Foundation for long-term technical knowledge and development of baselines to support future repetitive job orders	From 0% to 50% (no parameters collection to initial structured collection) **IN PROGRESS**

Table 3 – Process maturity assessments

3.6.2. Future activities

On the basis of the experience gained during the course of the development and application of the countermeasures, several areas of potential improvement have been recognized. These areas are aimed at reinforcing the achievements already made in the field and paving the way for the transition to a more formalized, integrated, and knowledge-based approach to project management. It also important to follow the lean thinking approach of continuous improvement and only in this way we can enhance the value of the countermeasures implemented.

- One of the most promising areas of potential improvement is the integration of the Visual Planning system with the ERP platform. The existing system, during its implementation, was found to exhibit high potential in terms of enhancing the visibility of the project. However, the system was found to have a structural drawback in the form of the need for manual updating. The integration of the system with the ERP platform would help in the automatic updating of the project information, thus enhancing the reliability of the system. In addition, the integration would help in the achievement of a higher degree of consistency in the operational activities and reducing the time used to insert the data manually.
- The Process Quality Assurance role is an important step forward in improving the integration of feedback, although some of its processes are in a state of consolidation. With the initial stages of implementation complete, the role has already helped to improve communication links between production and project management. However, in the future, it is hoped that its procedures can be fully stabilized to ensure that production feedback is properly utilized to improve the execution of future projects.
- The collection of technical parameters during the execution of this particular project has demonstrated the significant potential that can be gained from integrating knowledge. The creation of a centralized database of process parameters can enable the organization to develop a technical base from which to establish the parameters of any future job orders that require similar processing. This can minimize the need to engage in trial-and-error settings to establish optimal production conditions while helping to support the operators in achieving optimal production conditions in an efficient manner.
- The benefits achieved in the scope of this project can be progressively shared to other production plants. The positive results achieved in the Vailate plant show that the benefits can be achieved in other operational situations. The generalization of the achieved benefits will allow the development of a more standardized project management approach.

- Another significant area where future development is required is related to the continuous training and alignment of the Project Managers, that can be done with the aid of external consultants and also, thanks to these new meetings they will have greater access to several information and details much more quickly. that can provide them with preliminary information on the development of new products, gaining deeper knowledge of the processes.

4 Conclusions

4.1. Goals achieved

The main purpose of the thesis was to face the problem of the lack of structured visibility and ownership of the new job orders. This was done through the application of the A3 problem-solving methodology to improve the transparency of the process, the supervision of the projects and to better coordinate the various functions of the organization.

Through the analysis of the existing process, it was possible to identify the structural limitations of the process. This was done through the investigation of the problems and its causes, to find the necessary countermeasures to solve it.

One of the most significant results achieved by this project was the evolution from a largely informal management approach to a more formalized process. The implementation of shared monitoring practices and responsibility assignment helped to improve process controllability and ownership continuity throughout the project lifecycle.

From a broader point of view, this project showed the effectiveness of the use of Lean principles and structured problem-solving approaches to support organizational improvement in a real-life industrial environment. The A3 methodology was found to be a valuable tool not only to address operational issues but also to facilitate organizational alignment and the promotion of a more systematic approach to process management and to include people in the change.

The implemented improvements represent a significant step towards a more controlled, transparent, and sustainable management of new job orders, creating a solid basis for further development of the organization.

4.2. Value for GPACK

From the point of view of GPACK, this experience represented an opportunity to analyse the process of its own project management, which had never been applied in the way it was in this experience. Being part of the daily operations was a key element because it was possible to emphasize, besides the technical aspects, the organizational habits developed over time, which had become a kind of routine.

Among the most important contributions made was the development of a more clear and shared understanding of the process itself. Some activities, which had been managed separately by the various actors involved, became part of a more visible and shared process. This contributed to the overall awareness of the process and the connection between the various functions involved.

Another key element in this context was the greater emphasis on the issue of continuity and responsibility in project management. The project also played a key role in reinforcing the understanding that managing a job order is not merely a sum of individual tasks, but rather a process requiring supervision and coordination throughout its entire life cycle. This change in perspective is a key step in a more organized and reliable management of operational activities.

The value of this project can be found in its contribution to GPACK in taking a step to a more conscious and organized management of its activities, particularly in a context where product complexity and customization require a greater level of process management.

4.3. Educational value of the experience

This experience marked a key step in my growth as a learning management engineer. The direct involvement in a concrete industrial reality gave me a chance to realize how complex and interconnected organizational processes can be, and how much their success relies on not only technical solutions but also clarity, communication, understanding and people.

One of the main lessons I learned during this experience is the importance of observing and understanding a process before attempting to improve it. The A3 methodology has taught me to look at problems in a systematic way, focusing on causes rather than the symptoms.

This experience also enabled me to acquire key skills like structured problem analysis. This was made possible by working closely with individuals from various functions and with the external consultants, which enabled me to realize the significance of listening, flexibility, and creating solutions that are not just technically right but also practically applicable.

This project enabled me to bridge the gap between theory studied in university and actual industrial practice by strengthening both my technical and cognitive skills. This project also reinforced my interest in process improvement and enabled me to gain valuable experience that will be crucial for my future career.

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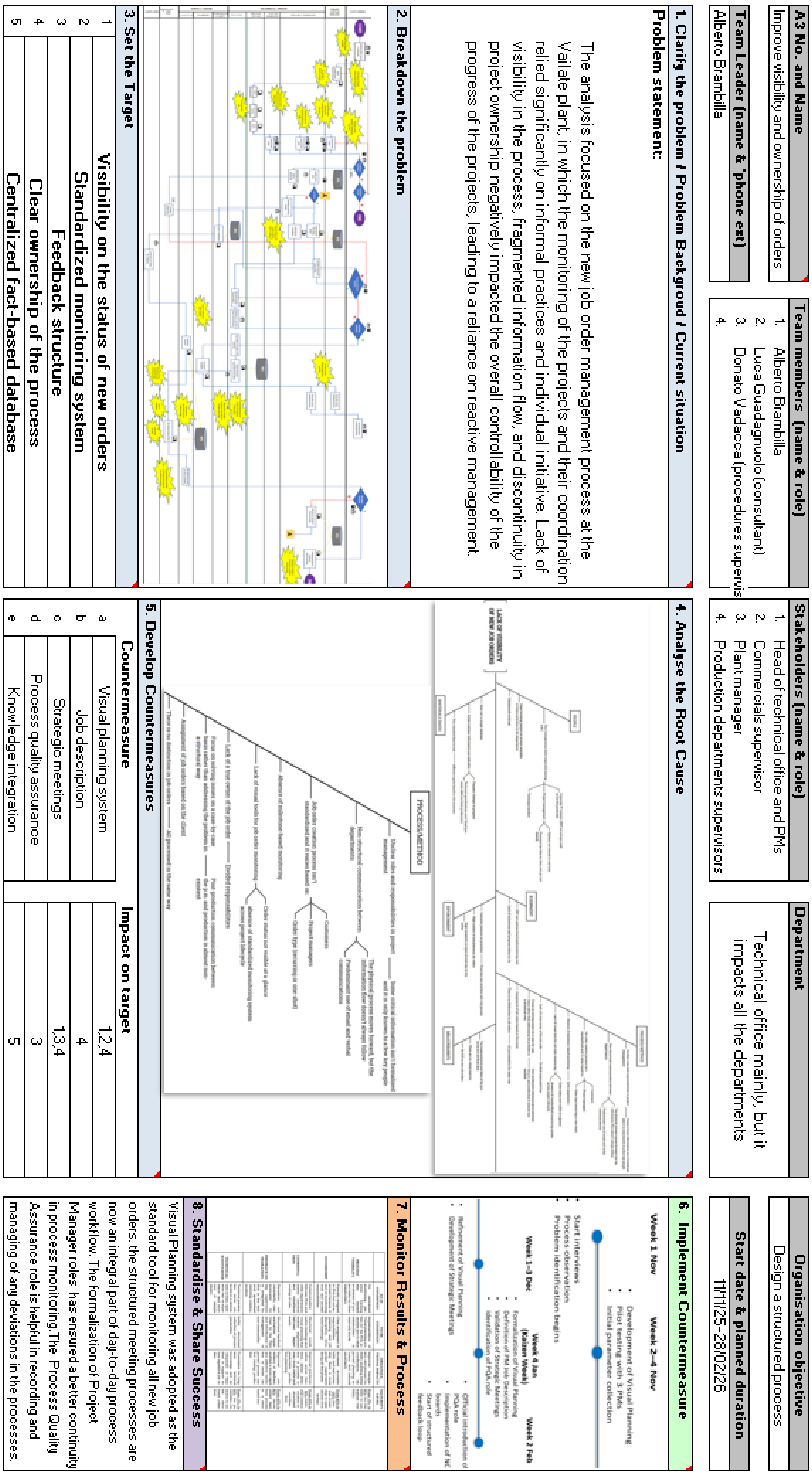
Appendix



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