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LEAN DEVELOPMENT, A LEVER OF SUBSTANTIAL SAVINGS FOR INDUSTRIAL COMPANIES

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In spite of streamlining efforts made by most industrial groups, product development activities still provide significant productivity opportunities and can benefit enormously from the adapted implementation of Lean principles.

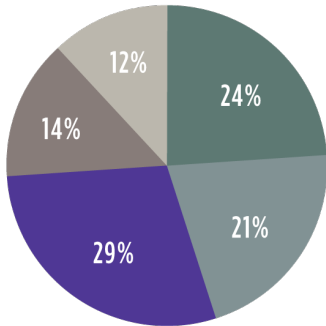
In industry, R&D objectives are evolving in step with stronger competitive pressure, increased product complexity and tougher constraints (technological, regulatory, contractual, etc.). They usually prompt companies to carry out actions to reduce release time to market for new products and curb development costs.

The streamlining actions conducted usually rely on the implementation of structured project management methods (planning, resources, budget) and on the heavy use of digital design support technologies (CAD, simulation, product data management).

Nevertheless, there are still areas for improvement. The value-added component of product development functions is still very low (around 30%, according to our experience feedback, see the chart below) and complex industrial projects often still suffer costly delays (design problems can emerge late, as shown by the delays in Airbus's A380 program).

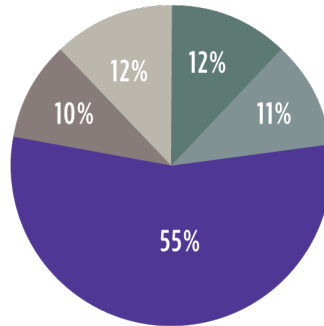
Average value added for R&D projects

Traditional engineering environment before Lean



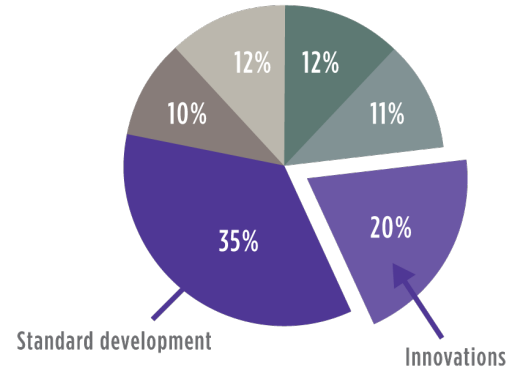
Initial state

Engineering environment after Lean



PHASE 1: Reduction of non-value added

Redistribution of resources freed for innovation projects



PHASE 2: Mobilisation of engineering resources freed by Lean

Research/Data-sharing
 Redesigning
 Value Added
 Meetings
 Other

By placing the emphasis on the use of standards, a comprehensive review of processes and the promotion of continuous improvement, Lean development allows organizations to achieve substantial gains, streamline existing operating methods and make them more reliable, and maintain these progress policies over time.

FUNDAMENTAL DIFFERENCES BETWEEN PRODUCT DEVELOPMENT AND PRODUCTION ACTIVITIES

Industrial production can be represented by continuous flows of materials and products whose quantities, production times and stocks can be easily measured and viewed.

Meanwhile, product development activities are associated with intangible transfers of information whose flows are neither continuous nor stable over time.

Examples include iterations between development phases, or development and redesign “loops”.

They also involve multiple parties (internal teams, subcontractors and partners), who need to share high volumes of data and whose activities must be carried out in parallel and in a coordinated fashion.

PRODUCT DEVELOPMENT VS EVOLUTION OF THE SERIES: A DIFFERENT APPROACH

Development of new products (long programs)

Projects involving the development of products on a case-by-case basis (resulting from platforms or completely new) are very often long and technically complex. In these contexts, we would implement Lean practices specific to program management:

- / **The comprehensive review of processes** through a value stream mapping approach.
- / **The systematic consideration of the customer’s voice.**
- / **The establishment of pull production** between customers and suppliers.
- / **The development of continuous improvement.**

For example, we carried out a Lean development approach at an international avionics and defence company that wanted to enhance the control of its R&D and improve its performance. The activities were extremely complex in nature and operations suffered from regular reorganizations that were insufficiently or poorly rolled out. The programs were structurally behind on development phases, predicted project costs were routinely overshoot and there was a chronic shortage of resources with specialist skills. In practice, this translated into customer

dissatisfaction, late penalties and contract losses. The methodology achieved recurring gains of around 20% thanks to an adapted and balanced approach:

- / **Organization:** clarification of roles and operating responsibilities between the Projects and the Business Lines and clarification of the objectives of projects in the development phase.
- / **Behaviours:** strengthening of decision-making abilities, leadership behaviours structured around factual elements (shared scorecards, performance indicators, observations and coaching on technical and coordination meetings). Enhancement, within the Business Lines, of behaviours aimed at anticipating technical problems and sharing know-how and knowledge.
- / **Process:** implementation of pulled development coordination, driven by the critical path method and the availability of specialized skills, and focused on creating value for the customer (introduction of Earned value management, or EVM). This coordination goes hand-in-hand, on the Business Line side, with the increased standardization of recurring work, the structured resolution of problems by teams and the introduction of systematic discussions

about improvements and communicating ideas until the completion of work batches.

In addition, these Lean principles applied to projects and engineering activities are joined by specific strategies linked to the product itself, such as:

- / **The introduction of the Design for X methodology** to ensure value creation that matches the customer's vision and is reconciled with the needs of the downstream phases of the product life cycle, such as production, logistics and maintenance.
- / **Modular standardization and design**, internally and in partnership with suppliers, to enable the achievement of economies of scale and time to market by limiting new developments and optimizing existing value.
- / **Set-based current engineering** (the parallel development of alternative solutions) to reduce the risk of technical deadlocks and make the development process more fluid.

Incremental developments (maintenance and evolution of series)

Throughout the life cycle of products,

manufacturers and equipment operators (e.g. rail operators and aeronautics companies) need to guarantee their ongoing operation, their renovation and their adaptation to developments in requirements and regulation.

These activities are different to development projects due to the high number of small engineering studies, the diversity and complexity of products (which increase with the age of the installed base and the coexistence of several generations of equipment) and the need for much sharper responsiveness than during development phases. As such, the challenge is to ensure business continuity by limiting equipment downtime.

Consequently, a stronger emphasis is placed on the main levers of mass productivity in the Lean approach, particularly:

- / **The standardization of processes**, the specialization of teams dedicated to repetitive activities and the development of the independence and versatility of teams.
- / **A significant reduction in processing times** by clearing bottle-necks identified by the value stream mapping methodology.





The success of these projects requires the involvement of teams that are the closest to the frontline (through so-called “Kaizen” participative workshops), the aim being to conduct a review and identify pragmatic solutions that are genuinely suited to requirements, and to foster acceptance by the teams of the solutions that are proposed.

The gains measured following these projects exceed 10% to 15% in terms of efficiency, costs and cycle times reduction. The clarification of processes and the roles of each individual also improves awareness and confidence, as shown through the interview of the manager of the engineering division at one of the SNCF’s (a French railway company) five technical centers

ADAPTING THE APPROACH

Lean development provides a comprehensive response to the new challenges of product innovation and development.

Although it shares the principles of lean manufacturing and lean office, the success of this methodology and its adoption are closely linked to its adaptation to the context of projects and the company culture, which requires the development and implementation of solutions in collaboration with the teams.

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