

Maturity Evolution in Benchmark Organizations¹

Case: Embraer Commercial Aviation²

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ABSTRACT

This article presents a longitudinal analysis of the evolution of project management maturity at Embraer Commercial Aviation, highlighting lessons learned, critical success factors, and challenges encountered throughout the journey. The research is based on formal maturity assessments, institutional documents, awards, and national and international recognitions. The study demonstrates Embraer's path toward consolidating a project and program management culture and proposes recommendations for its continuous improvement in this area.

Keywords: project management maturity, lessons learned, Embraer Commercial Aviation, Embraer S.A.

"The content and opinions presented in this article were developed by the authors based on their professional experience and reflect solely their own views. They do not represent the official position of Embraer."

ABOUT EMBRAER

Embraer is one of the world's largest aerospace conglomerates and a leader in the market segments in which it operates, with revenues of approximately US\$7.6 billion in 2025.

¹ Editor's note: This case study was the result of project management maturity research by Professor Darci Prado, who coordinated the submittal of this case study. Dr. Prado's long-term research program on this subject has been conducted in Brazil and other countries over many years. Darci is the creator of the Prado Project Management Maturity Model, which has been successfully implemented by numerous organizations in Brazil. More details about the model and the research can be found at <https://maturityresearch.com/en/home/>

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The company operates through an integrated model encompassing the development, production, and support of commercial, executive, defense, and agricultural aircraft, while also investing in new technologies aimed at advancing air mobility. It is also active in other sectors, such as radar systems and frigates. Internationally recognized for its engineering capabilities and innovation, the company has built a strong presence across multiple aviation segments, combining products, services, and solutions that serve commercial, governmental, and private customers.

Its operations are organized into complementary business units that contribute to the diversity of its activities.

As of 2026, Embraer is divided into the following business units: Commercial Aviation, Executive Aviation, Defense, and Services & Support. The company has delivered more than 9,000 aircraft to customers in over 100 countries.

In commercial aviation, the company specializes in mid-sized aircraft, primarily designed for regional and lower-density routes. This positioning enables airlines to operate more efficiently by matching capacity to demand and optimizing costs. This segment plays a particularly important role in regional connectivity, linking cities that cannot support larger aircraft.

In executive aviation, Embraer holds a prominent position in the global market, offering aircraft that serve everyone from individual customers to large corporations. Its portfolio covers different jet categories, emphasizing performance, comfort, and technology. This segment is characterized by a premium customer experience and clients who value reliability and innovation.

The company also maintains a significant presence in the defense and security sector, developing aircraft and systems for military, logistics, and surveillance missions. This segment involves not only the manufacture of equipment but also the delivery of comprehensive solutions, including support, modernization, and systems integration. Its presence in this market reinforces the company's technological capabilities and strategic relevance on an international scale.

Another important component of Embraer's operations is its Services and Support division, which accompanies aircraft throughout their entire lifecycle. This division includes maintenance, spare parts supply, training, and digital solutions for operational management. The extensive installed base of aircraft worldwide creates an ongoing relationship with customers, contributing to the reliability and performance of air operations.

Beyond its traditional businesses, the company also invests in innovation and the development of new forms of air mobility. One example is its initiative focused on urban air mobility, which seeks to develop electric vertical takeoff and landing (eVTOL) aircraft. These solutions aim to enable new transportation models, especially in urban environments, with a focus on sustainability and efficiency.

With a global presence, Embraer serves customers in numerous countries and maintains an international support and partnership network. This global reach is sustained by a combination of technical expertise, adaptability to different markets, and the capability to deliver solutions across diverse operational contexts.

THE GREAT DREAM

Embraer's history is deeply connected to a dream that began taking shape in the 1940s. This dream was conceived by Air Marshal Casimiro Montenegro Filho, who believed that Brazil's technological development depended on the education of highly qualified engineers and the establishment of a solid scientific knowledge base. This vision led to the creation of the Aeronautics Institute of Technology (ITA) in São José dos Campos in 1950, with the mission of training professionals capable of driving the country toward technological self-sufficiency.

ITA was not merely an engineering school but the starting point of a broader project: the creation of a national aerospace industry. Throughout the 1950s and 1960s, the institute graduated generations of engineers distinguished by technical excellence and an innovative spirit, creating an environment capable of transforming knowledge into industrial capability. This movement gained even greater momentum with the establishment of the Aeronautics Technical Center (CTA) in 1961, now known as the Department of Aerospace Science and Technology (DCTA), where the first Brazilian aeronautical projects were developed.

The continuation of this dream was made possible by a team whose leadership prominently included Ozires Silva, who developed the first Brazilian aircraft, the Bandeirante, whose maiden flight took place in 1968. It was within this context that Embraer was founded in 1969 as the embodiment of this great vision: to design, develop, and manufacture aircraft in Brazil. The company was established with the mission of transforming accumulated technical knowledge into products capable of competing in the global marketplace. Over the following decades, Embraer evolved rapidly, establishing itself as an organization with strong engineering, manufacturing, and management capabilities, able to compete with major international players.

During the 1970s and 1980s, the company achieved significant milestones through the development of aircraft such as the Bandeirante and the Brasília, which helped shape the regional aviation market. In the 1990s, particularly after its privatization in 1994, Embraer underwent a significant transformation, increasing efficiency, strengthening its international presence, and beginning a new cycle of growth.

This transformation led to the launch of the first generation of E-Jets in the late 1990s and early 2000s, consolidating the company's leadership in the commercial jet segment of up to 150 seats. This strategic positioning allowed Embraer to become a global reference in regional aviation, with aircraft recognized for their efficiency, comfort, and reliability.

The continuation of this path of innovation and excellence is clearly embodied in the E-Jets E2 program, officially launched in 2013, with its first flight taking place in 2016 and entry into service in 2018. This new generation of aircraft represents a significant technological leap, incorporating substantial improvements in fuel efficiency, emissions reduction, advanced aerodynamics, and passenger experience.

The success of the E2 program symbolizes Embraer's maturity as a global high-technology company capable of designing and delivering competitive solutions on an international scale. More than a product evolution, the E2 represents the continuation of a purpose initiated decades earlier: transforming knowledge into innovation and innovation into tangible achievements.

Thus, the dream initiated by Casimiro Montenegro Filho with the creation of ITA in 1950 evolved over time and ultimately became a robust aerospace industry recognized worldwide. Embraer is therefore the living expression of this long-term project—an example of how vision, education, and engineering can be transformed into technological development and global prominence.

THE EVOLUTION OF THE PMO IN EMBRAER COMMERCIAL AVIATION

Embraer was the market leader in regional commercial aircraft with its ERJ 135, 140, and 145 families. In 2004, the E-Jets entered in service and quickly Embraer became market leader as well in the 70- to 130-seat category. As production and product support demands continued to grow, the company needed to pursue even more effective management approaches.

This initiative encompassed improvements in planning, governance, management of the various project management knowledge areas, and resource management. To support these efforts, the Commercial Aviation PMO team was established in 2008, taking responsibility for methods, processes, people, and tools.

The company sponsored workforce development through training programs, professional certifications (particularly the PMP certification), and the dissemination of project management knowledge across the organization.

From a tools perspective, a major milestone was the adoption of Critical Chain Project Management (CCPM) and other techniques derived from the Theory of Constraints. Resource management was initially performed using Excel-based solutions and later evolved into a customized implementation of ProChain software. This solution subsequently received industry recognition for the effective way it met the company's needs and continues to support operations to this day.



In addition to the extensive internal improvements that were implemented, Embraer initiated benchmarking activities and formal assessments of its project management system. The first assessment was conducted using OPM3® (Organizational Project Management Maturity Model), supported by an external consulting company. The results showed strong performance in Project Management but also identified several opportunities for improvement in Program Management, particularly in project selection, benefits management, and value proposition development.

In 2012, the launch of an improvement program for the E175 aircraft, a highly successful initiative that continues to generate aircraft orders to this day, provided an opportunity to address many of the gaps identified in the OPM3 assessment. One notable advancement was the quantification of benefits associated with projects within the program. While benefits such as fuel consumption reduction are relatively straightforward to quantify, improvements related to aircraft interiors, for example, are much more difficult to measure. This experience became an important lesson learned and provided valuable preparation for the next major initiative: the E-Jets E2 Program.

The E2 Program was launched with a robust value proposition and a comprehensive set of associated Key Performance Indicators (KPIs). This represented a significant step forward in program management maturity. Deliverables, decisions, risk management, and project plans were all aligned and driven by the value proposition. During the development of the E2 Program, Embraer also established a maturity measurement system designed to support and reinforce the company's Excellence Policy.



These assessments were conducted from 2014 through 2021, when Embraer Commercial Aviation decided to transition to a widely recognized market-standard maturity assessment methodology. This approach would not only provide a consolidated framework for evaluating organizational maturity but also enable benchmarking against peer organizations in the aerospace industry as well as leading companies from other sectors.

MEASURE IN 2014

Escopo/WBS/Mudança	atual
O processo de gestão do escopo/WBS/mudança do Programa está definido, acordado, publicado e sendo utilizado adequadamente?	75%
O processo de gestão da proposta de valor/ benefícios do Programa está definido, acordado, publicado e sendo utilizado adequadamente?	50%
O processo de gestão do PA Horizontal do Programa está definido, acordado, publicado e sendo utilizado adequadamente?	50%
O processo de gestão dos acordos de catchball/ orçamento do Programa está definido, acordado, publicado e sendo utilizado adequadamente?	100%
O processo de gestão de prazo do Programa está definido, acordado, publicado e sendo utilizado adequadamente? (ex: Fever Chart, MPP, Strategy e PAN)	50%
O processo de gestão de requisitos do Programa está definido, acordado, publicado e sendo utilizado adequadamente?	50%
O processo de gestão de problemas, riscos e oportunidades está definido, acordado, publicado e sendo utilizado adequadamente?	75%
O processo de gestão de fornecedores externos está definido, acordado, publicado e sendo utilizado adequadamente?	50%
O processo de gestão de stakeholders/ comunicação está definido, acordado, publicado e sendo utilizado adequadamente?	100%
O processo de gestão de infra-estrutura está definido, acordado, publicado e sendo utilizado adequadamente?	100%
O processo de gestão de qualidade do Programa está definido, acordado, publicado e sendo utilizado adequadamente?	75%
O processo de gestão do PLM (Program Lifecycle Management) do Programa está definido, acordado, publicado e sendo utilizado adequadamente?	75%
O processo de gestão do plano de desenvolvimento de pessoas está definido, acordado, publicado e sendo utilizado adequadamente?	50%
	69%





Escopo/WBS/Mudança	Atual	
1 O processo de gestão do escopo/WBS/mudança do Programa está definido, acordado, publicado e sendo utilizado adequadamente?	75%	
2 O processo de gestão da proposta de valor/benefícios do Programa está definido, acordado, publicado e sendo utilizado adequadamente?	75%	
3 O processo de gestão do MAP/ PA Horizontal do Programa está definido, acordado, publicado e sendo utilizado adequadamente?	50%	
4 O processo de gestão dos acordos de catchball/orçamento do Programa está definido, acordado, publicado e sendo utilizado adequadamente?	100%	
5 O processo de gestão de prazo do Programa está definido, acordado, publicado e sendo utilizado adequadamente? (ex: Fever Chart, MPP, Strategy e PAN)	100%	
6 O processo de gestão de requisitos do Programa está definido, acordado, publicado e sendo utilizado adequadamente?	75%	
7 O processo de gestão de problemas, riscos e oportunidades está definido, acordado, publicado e sendo utilizado adequadamente?	75%	
8 O processo de gestão de fornecedores externos está definido, acordado, publicado e sendo utilizado adequadamente?	75%	
9 O processo de gestão de stakeholders/comunicação está definido, acordado, publicado e sendo utilizado adequadamente?	100%	
10 O processo de gestão de infra-estrutura está definido, acordado, publicado e sendo utilizado adequadamente?	100%	
11 O processo de gestão de qualidade do Programa está definido, acordado, publicado e sendo utilizado adequadamente?	75%	
13 O processo de gestão do plano de desenvolvimento de pessoas está definido, acordado, publicado e sendo utilizado adequadamente?	50%	
Média:	79%	

Escopo/WBS/Mudança	Atual	
1 O processo de gestão do escopo/WBS/mudança do Programa está definido, acordado, publicado e sendo utilizado adequadamente?	75%	
2 O processo de gestão da proposta de valor/benefícios do Programa está definido, acordado, publicado e sendo utilizado adequadamente?	75%	
3 O processo de gestão do MAP/ PA Horizontal do Programa está definido, acordado, publicado e sendo utilizado adequadamente?	50%	
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13 O processo de gestão do plano de desenvolvimento de pessoas está definido, acordado, publicado e sendo utilizado adequadamente?	75%	
Média:	81%	

THE EVOLUTION OF MATURITY USING THE DARCI PRADO METHOD

Based on internal assessment, which indicated a maturity level of approximately 4.0, and considering that this assessment did not include certain aspects such as tools and process stabilization, Embraer estimated that its maturity level would be closer to 3.0 when evaluated using the Darci Prado Method, given the way the questions are structured within each assessment criterion.

Embraer continued preparing and improving its management practices, focusing on the opportunities identified through our internal assessment process. During this period, it was observed progress in several areas, particularly in competency management and people development.

In 2021, Embraer conducted our first maturity assessment using the Darci Prado Method and achieved a score of 3.9. Whenever the assessment questions referred specifically to projects, Embraer also evaluated them from a program management perspective. Based on the results, Embraer concluded that its internal assessment score of approximately 4.0 was consistent, and that the difference was primarily due to the change in methodology rather than a decline in organizational maturity.

Following this first assessment using the Darci Prado Method, Embraer established an improvement plan focused on several key areas:

- Stabilizing an integrated information system capable of supporting the entire program life cycle
- Optimizing selected processes and tools
- Strengthening stakeholder management
- Enhancing systems thinking
- Improving risk management practices
- Increasing technical alignment across teams while developing behavioral competencies
- Reinforcing the use of lessons learned
- Strengthening the integration between projects and strategic initiatives

An interesting observation was that not all improvement opportunities were explicitly identified through the Prado Method itself. Because the assessment was conducted collaboratively with a group of experienced professionals, additional improvement opportunities naturally emerged from discussions regarding the organization's methods, processes, people, and tools.

In 2022, Embraer conducted a second assessment. As a result of the action plan that had been implemented, its maturity score improved from 3.9 to 4.11.

With maturity level now above 4.0, the team identified the following opportunities for further improvement:

- Increasing awareness and understanding of project and program charter documents
- Evaluating whether risk management adequately covered areas beyond performance indicators
- Strengthening business plan monitoring and follow-up
- Expanding the lessons learned legacy from ongoing programs
- Further improving program planning practices
- Anticipating the deployment and cascading of organizational goals
- Enhancing training and development in human and behavioral competencies
- Stabilizing the life-cycle management and monitoring tool

Embraer then established a two-year improvement plan and prepared for a new assessment in 2025.

For the 2025 assessment, it was decided to expand the scope to include the entire Commercial Aviation Program Management Directorate. Despite the improvements implemented through

its action plan, Embraer anticipated that achieving a significant increase in maturity would be more challenging due to the broader organizational scope.

The results were highly positive, with the maturity score increasing from 4.11 to 4.34.

My Results

Version V2.4.0

Todas as perguntas foram preenchidas. Obrigado pela sua participação.

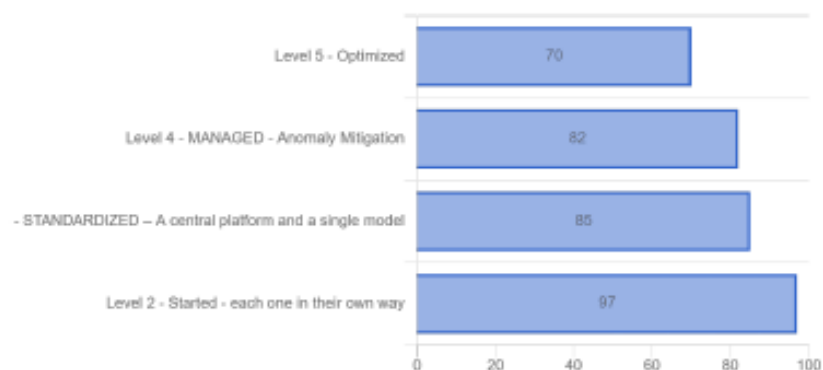
Company: Embraer

Evaluated sector: Aviação Comercial

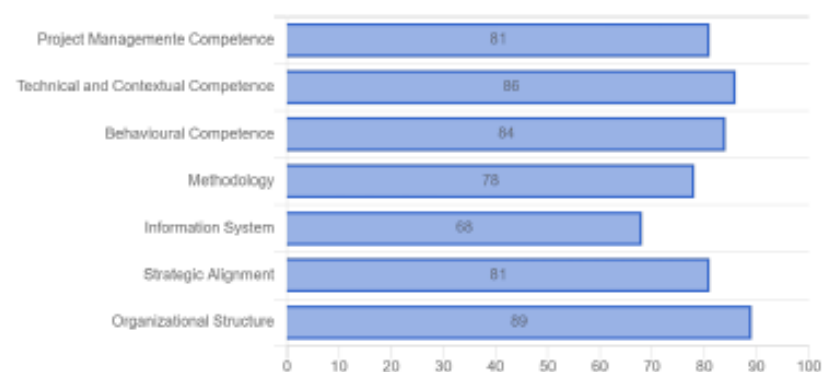
Completion date: August 21, 2026

Final Evaluation: 4.34

Points by Level



Adherence to Dimensions (%)



Alongside the improvement in its maturity score, Embraer identified new opportunities for advancement as part of our continuous improvement process.

In particular, Embraer recognized areas for further development in **Project and Program Management Competencies** and **Information Systems Support (Informatization)**. However, additional opportunities were also identified and have been incorporated into the new action plan.

ACTUAL PRACTICES OF PROJECT MANAGEMENT AND MATURITY MEASUREMENT AT EMBRAER

Since 2007, Embraer has used a robust management system based on Lean principles, consolidated through P3E (Programa de Excelência Empresarial Embraer – Embraer Enterprise Excellence Program) and formalized in the corporate Excellence System. For many years, this system worked as the main reference for defining excellence practices and guidelines across the company. This model created a solid and integrated foundation, ensuring alignment and consistency among the different business areas. However, as the company's maturity evolved and the operational contexts became more complex and specific, it became clear that a more focused approach was needed to translate the concept of "excellence" into the reality of each area.

In this context, the company started to move from a centralized model to an approach structured by Excellence Manuals for each area. This allowed better alignment with operational realities, while still keeping the corporate direction. As part of this movement, the Program areas from the different Business Units joined efforts to create the Program Management Excellence Manual, establishing common management guidelines that combine standardization, strategic consistency, and flexibility to adapt to different application scenarios.

The development of the Program Management Excellence Manual combined recognized market references, such as PMBOK, with Embraer's internal practices and the Lean principles from P3E. The result was a model aligned with the company's reality and applicable to its operational context. Its first version was published in 2022 and, since then, a broad group of employees has continued to promote recurring discussions, bringing new perspectives and adjustments to keep the Manual aligned with the most current view of excellence in Program Management.

Together with the Manual, and with the objective of encouraging its use, recognizing good practices, and identifying improvement opportunities, an internal maturity diagnosis system was created — the Manual Lean Diagnosis. This diagnosis was structured based on the Manual chapters, evaluating, for each group of practices, whether the processes are described, adopted, controlled, and evolving. Unlike traditional market models, such as OPM3 and Darci Prado, this diagnosis was designed from Embraer's own view of excellence, covering the full lifecycle of programs.

Even so, it is important to highlight that one of the diagnosis criteria evaluates the use of maturity methods that allow comparison and external benchmarking. This reinforces that the Excellence Manual does not aim to replace market models, but to work together with them in a complementary way.

The evaluation criteria are periodically reviewed by the same group responsible for the evolution of the Manual, ensuring consistency between the guidelines and the evaluation mechanisms. The Program teams perform the self-assessment every year and, every two years, this assessment is complemented by the Lean consultants, who help validate the teams' perception. It is important to mention that this process is not an audit, but a way to align the understanding of how close the areas are to excellence.

Based on the evidence collected in these two evaluation moments, action plans are developed to support maturity evolution. The process also promotes events to share good practices among the areas, encouraging collective learning. In Commercial Aviation, already in its fourth evaluation cycle, the benefits of this model are clear, especially in the quality of the discussions created during the process, which have become an important source of learning and insights for continuous evolution toward excellence.



Therefore, the evolution of Program Management practices at Embraer is not only about adopting new references. It reflects a continuous movement of integration between methods, organizational learning, and adaptation to the business reality. The combination of an internal model, structured through the Excellence Manual, with the complementary use of external

benchmarks allows the company not only to measure its maturity, but also to consistently guide its next steps. In this context, the main challenge is no longer only the definition and local use of good practices, but their broad, consistent, and sustainable application, consolidating maturity as a living organizational capability, in constant evolution.

One example of this is the award Embraer received in 2024 from the Global Kaizen Award.

This is an international recognition that celebrates companies that truly live continuous improvement. It is not only about having Lean projects, but about applying the principles consistently and achieving concrete results. The Kaizen Awards recognize companies that are doing this with excellence — optimizing processes, reducing waste, and engaging people.

For a Lean company, this award has significant value. It confirms that the company is on the right path and that its practices are not only recognized internally, but also globally. It strengthens the company's reputation, inspires the teams, and shows that the effort to develop culture and processes is creating real value. In addition, it can open doors to new partnerships and business opportunities.



FINAL CONSIDERATIONS

A company that was born from great dreams, that continuously turns them into reality, and that competes with global market giants must also dedicate attention to foundational matters — those that are important, even when they are not always urgent. In this context, maturity in

methods, processes, people, and tools becomes essential to sustain evolution and ensure the long-term continuity of the business.

Thus, the pursuit of measuring, controlling, and improving becomes an integral part of the organizational culture, guiding decisions and directing continuous improvement efforts. Participation in events and awards, both in Brazil and abroad, reinforces this positioning and highlights Embraer's recognition as a reference in management on the global stage.

The journey presented reinforces that maturity in project and program management at Embraer is not a state to be reached, but a capability that is continuously built and renewed. Over the years, the combination of market references, internal development, and collective learning has enabled the organization to evolve consistently, connecting practice to strategy and results to purpose. The transition to the Excellence Manuals and their diagnoses represents more than a change in approach — it reveals a pursuit of excellence that is increasingly conscious, integrated, and applicable to the business reality. In this scenario, the true differentiator is no longer only knowing the best practices, but the ability to apply them with consistency, adaptability, and systemic vision, keeping the organization in constant evolution in the face of new challenges.

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Tamires Françaço de Costa is a Program Administrator at Embraer, working in Commercial Aviation with a focus on investment portfolio management, project governance, and the evolution of organizational maturity. She has experience in implementing management methods, structuring performance indicators, and leading continuous improvement initiatives, including the application of Lean Assessment and maturity models such as Darci Prado. She holds a degree in Industrial Mechanical Engineering, postgraduate degree in Business Management, has an MBA in Project Management, and is interested in developing excellence practices in program management, cross-functional integration, and strengthening data-driven decision-making. She lives in Jacareí (SP) Brazil. Email: tamires.costa@embraer.com.br.



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He has been with Embraer for 25 years and has participated in the development of aircraft programs across the Defense & Security, Executive Aviation, and Commercial Aviation business units. In addition to project execution, he is actively involved in process improvement, people development, and knowledge sharing both inside and

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