# CELIO FRANCISCO FILHO: MECHATRONIC ENGINEER LEADING THE JUST-IN-TIME SYSTEM BETWEEN DYNA AND FIAT

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# CELIO FRANCISCO FILHO: INGENIERO MECATRÓNICO A CARGO DEL SISTEMA JUST-IN-TIME ENTRE DYNA Y FIAT

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## ABSTRACT

This article examines the leadership and technical expertise of Celio Francisco Filho, a mechatronic engineer who successfully implemented a Just-In-Time (JIT) delivery system between the Brazilian automotive supplier Dyna and the automaker Fiat. The study highlights the integration of production processes, real-time logistics synchronization, and digital transformation strategies that enabled significant improvements in operational efficiency, inventory reduction, and delivery accuracy. Additionally, it addresses the cultural and organizational changes necessary to sustain JIT practices and positions the project within the broader context of lean manufacturing and Industry 4.0. The case exemplifies how multidisciplinary leadership and innovative supply chain management contribute to competitive advantage in the automotive sector.

**Keywords:** Just-In-Time. Lean Manufacturing. Supply Chain Integration. Automotive Industry. Digital Transformation.

## RESUMO

Este artigo examina a liderança e a expertise técnica de Celio Francisco Filho, engenheiro mecatrônico que implementou com sucesso um sistema de entrega Just-In-Time (JIT) entre a fornecedora automotiva brasileira Dyna e a montadora Fiat. O estudo destaca a integração dos processos de produção, a sincronização logística em tempo real e as estratégias de transformação digital que permitiram melhorias significativas na eficiência operacional, redução de estoque e precisão na entrega. Além disso, aborda as mudanças culturais e organizacionais necessárias para sustentar as práticas JIT e posiciona o projeto dentro do contexto mais amplo da manufatura enxuta e da Indústria 4.0. O caso exemplifica como a liderança multidisciplinar e a gestão inovadora da cadeia de suprimentos contribuem para a vantagem competitiva no setor automotivo.

**Palavras-chave:** Just-In-Time. Manufatura Enxuta. Integração da Cadeia de Suprimentos. Indústria Automotiva. Transformação Digital.

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**RESUMEN**
Este artículo examina el liderazgo y la experiencia técnica de Celio Francisco Filho, un ingeniero mecatrónico que implementó con éxito un sistema de entrega Just-In-Time (JIT) entre el proveedor automotriz brasileño Dyna y el fabricante de automóviles Fiat. El estudio destaca la integración de los procesos de producción, la sincronización logística en tiempo real y las estrategias de transformación digital que permitieron mejoras significativas en la eficiencia operativa, la reducción de inventario y la precisión en las entregas. Además, aborda los cambios culturales y organizativos necesarios para mantener las prácticas JIT y sitúa el proyecto en el contexto más amplio de la fabricación ajustada y la Industria 4.0. El caso ejemplifica cómo el liderazgo multidisciplinar y la gestión innovadora de la cadena de suministro contribuyen a la ventaja competitiva en el sector automovilístico.

**Palabras clave:** Just-In-Time. Fabricación ajustada. Integración de la cadena de suministro. Industria automovilística. Transformación digital.

## INTRODUCTION

Efficiency, responsiveness, and waste reduction have long been the guiding principles of the automotive industry. In this context, the collaboration between the Brazilian auto parts supplier Dyna and the automotive giant Fiat stands out as a benchmark in operational excellence, made possible through the leadership of mechatronic engineer Celio Francisco Filho. By implementing a Just-In-Time (JIT) delivery system, Francisco Filho orchestrated the integration of Dyna's manufacturing cadence with Fiat's assembly line, achieving a seamless and real-time logistical symbiosis.

The JIT system, first developed by Toyota in the mid-20th century, revolves around delivering components precisely at the moment they are needed in the production process, thereby eliminating intermediate inventories and increasing overall efficiency (Ohno, 1988; Monden, 2011). Applying this model to the Brazilian context required not only technical adjustments but a transformation of the operational culture within Dyna. Francisco Filho spearheaded this transition by overseeing a comprehensive reengineering of internal production processes, customizing enterprise resource planning (ERP) systems for direct communication with Fiat, and deploying real-time performance monitoring through dashboards, barcode scanners, and sensor technologies.

Moreover, the initiative included the establishment of a dedicated dispatch cell for Fiat, the training of staff in lean manufacturing principles, and the introduction of continuous improvement cycles based on real-time data analytics. This integrated approach reflects the broader application of lean production strategies, as discussed by Womack and Jones (1996), which emphasize the reduction of non-value-adding activities through systemic synchronization and standardization.

Francisco Filho's leadership was crucial in fostering a collaborative ecosystem between Dyna and Fiat's engineering, logistics, and IT teams. Through frequent technical meetings and simulations, the project reached the reliability standards required for full-scale deployment, known as the go-live phase. This underscores the role of cross-functional communication in complex supply chain systems, as noted by Christopher (2016), who emphasizes the necessity of agility and trust in contemporary supply chain integration.

The measurable outcomes of the JIT implementation at Dyna were significant. The average lead time from order to delivery was reduced by 30%, dropping from 48 hours to 33 hours. Intermediate inventories were cut by 40%, and delivery accuracy surpassed 99%, exceeding Fiat's quality expectations. These results align with the documented benefits of

JIT systems in reducing cycle times, enhancing product quality, and improving customer satisfaction (Schonberger, 2007).

In addition to the operational benefits, the JIT system introduced at Dyna under Celio Francisco Filho's leadership also reinforced the company's adaptability and resilience in a dynamic market environment. In volatile sectors like automotive manufacturing, responsiveness to demand fluctuations and shorter product life cycles are essential. According to Holweg (2007), JIT systems enable firms to align their production with real-time market needs, reducing the risk of overproduction and obsolescence. By minimizing idle inventory and improving forecast accuracy through constant data exchange with Fiat, Dyna significantly enhanced its demand responsiveness and production planning.

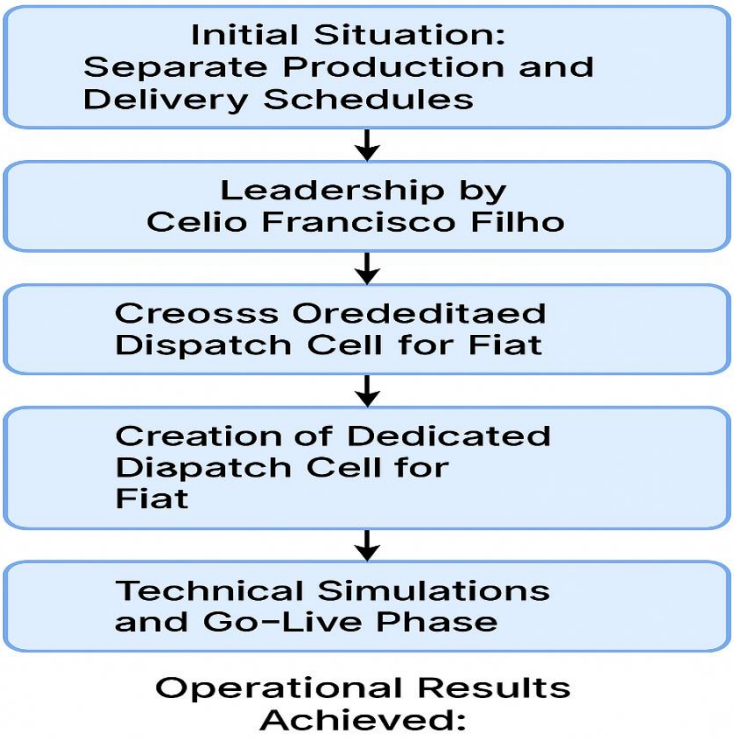
Furthermore, the project exemplifies the growing importance of digital transformation in supply chain management. The integration of real-time dashboards, barcode readers, and sensor technologies reflects the broader trend of digital supply networks (DSNs), which leverage data analytics and automation to increase visibility and control across the entire value chain. As noted by Ivanov, Tsipoulanidis, and Schönberger (2019), digitalization allows for more proactive and predictive supply chain decisions, fostering not only efficiency but also resilience. Francisco Filho's strategy of embedding smart systems into daily operations positioned Dyna at the forefront of this shift toward Industry 4.0 practices.

Lastly, the cultural shift required for the success of the JIT system cannot be overstated. Lean manufacturing principles demand a workforce that is both highly skilled and deeply engaged in continuous improvement processes. Liker (2004) emphasizes that lean transformations are as much about people and culture as they are about tools and techniques. By investing in team training and fostering a culture of operational discipline and accountability, Francisco Filho ensured that the transition to JIT was not a temporary optimization, but a sustainable competitive advantage embedded in Dyna's organizational DNA.

The flowchart summarizes the streamlined implementation of a Just-In-Time (JIT) system led by Celio Francisco Filho between Dyna and Fiat. It begins with the challenge of disconnected production and delivery schedules and highlights Filho's leadership in initiating organizational change. The process includes establishing a dedicated dispatch cell tailored to Fiat's needs and advancing to the technical simulations and go-live phase. The result was a highly synchronized supply chain marked by substantial operational improvements—such as reduced lead times, lower inventory levels, and enhanced delivery

accuracy—demonstrating the effectiveness of lean manufacturing and strategic collaboration.

**Figure 1.** Flowchart of the Just-In-Time Implementation Process Between Dyna and Fiat.




**Source:** Created by author.

Internally, the project became a reference in organizational innovation and operational excellence, demonstrating the effectiveness of systemic thinking applied to engineering and logistics. Celio Francisco Filho's multidisciplinary expertise in mechatronics, automation, and industrial processes enabled him to approach the challenge not just as a technical task, but as a strategic transformation of the company's role within the supply chain. The Dyna-Fiat JIT project exemplifies the evolution of supplier-manufacturer relationships in the automotive sector. Rather than merely delivering parts, Dyna, under Francisco Filho's guidance, began delivering predictability, punctuality, and reliability—hallmarks of a mature industrial actor prepared for the demands of Industry 4.0. As Francisco Filho aptly summarizes, "JIT is more than a methodology: it is a commitment to excellence, to the customer's timing, and to the intelligence of the process."

## REFERENCES

1. Christopher, M. (2016). Logistics & Supply Chain Management (5th ed.). Pearson Education.

2. Holweg, M. (2007). The genealogy of lean production. Journal of Operations Management, 25(2), 420–437.

3. Ivanov, D., Tsipoulanidis, A., & Schönberger, J. (2019). Global Supply Chain and Operations Management: A Decision-Oriented Introduction to the Creation of Value. Springer.

4. Liker, J. K. (2004). The Toyota Way: 14 Management Principles from the World's Greatest Manufacturer. McGraw-Hill.

5. Monden, Y. (2011). Toyota Production System: An Integrated Approach to Just-In-Time (4th ed.). CRC Press.

6. Ohno, T. (1988). Toyota Production System: Beyond Large-Scale Production. Productivity Press.

7. Schonberger, R. J. (2007). Best Practices in Lean Six Sigma Process Improvement: A Deeper Look. John Wiley & Sons.

8. Womack, J. P., & Jones, D. T. (1996). Lean Thinking: Banish Waste and Create Wealth in Your Corporation. Simon & Schuster.

9. Silva, J. F. (2024). SENSORY-FOCUSED FOOTWEAR DESIGN: MERGING ART AND WELL-BEING FOR INDIVIDUALS WITH AUTISM. *International Seven Journal of Multidisciplinary*, *1*(1). https://doi.org/10.56238/isevmjv1n1-016

10. Silva, J. F. (2024). Enhancing cybersecurity: A comprehensive approach to addressing the growing threat of cybercrime. *Revista Sistemática*, *14*(5), 1199–1203. https://doi.org/10.56238/rcsv14n5-009

11. Venturini, R. E. (2025). Technological innovations in agriculture: the application of Blockchain and Artificial Intelligence for grain traceability and protection. *Brazilian Journal of Development*, *11*(3), e78100. https://doi.org/10.34117/bjdv11n3-007

12. Turatti, R. C. (2025). Application of artificial intelligence in forecasting consumer behavior and trends in E-commerce. *Brazilian Journal of Development*, *11*(3), e78442. https://doi.org/10.34117/bjdv11n3-039

13. Garcia, A. G. (2025). The impact of sustainable practices on employee well-being and organizational success. *Brazilian Journal of Development*, *11*(3), e78599. https://doi.org/10.34117/bjdv11n3-054

14. Filho, W. L. R. (2025). The Role of Zero Trust Architecture in Modern Cybersecurity: Integration with IAM and Emerging Technologies. *Brazilian Journal of Development*, *11*(1), e76836. https://doi.org/10.34117/bjdv11n1-060

15. Antonio, S. L. (2025). Technological innovations and geomechanical challenges in Midland Basin Drilling. *Brazilian Journal of Development*, *11*(3), e78097. https://doi.org/10.34117/bjdv11n3-005

16. Moreira, C. A. (2025). Digital monitoring of heavy equipment: advancing cost optimization and operational efficiency. *Brazilian Journal of Development*, *11*(2), e77294. https://doi.org/10.34117/bjdv11n2-011

17. Delci, C. A. M. (2025). THE EFFECTIVENESS OF LAST PLANNER SYSTEM (LPS) IN INFRASTRUCTURE PROJECT MANAGEMENT. *Revista Sistemática*, *15*(2), 133–139. https://doi.org/10.56238/rcsv15n2-009

18. SANTOS,Hugo;PESSOA,EliomarGotardi.Impactsofdigitalizationontheefficiencyandqualityofpublicservices:Acomprehensiveanalysis.LUMENETVIRTUS,[S.l.],v.15,n.40,p.44094414,2024.DOI:10.56238/levv15n40024.Disponívelem:https://periodicos.newsciencepubl.com/LEV/article/view/452.Acessoem:25jan.2025.

19. Freitas,G.B.,Rabelo,E.M.,&Pessoa,E.G.(2023).Projetomodularcomreaproveitamentodecontainermaritimo.BrazilianJournalofDevelopment,9(10),28303-28339.https://doi.org/10.34117/bjdv9n10057

20. Pessoa,E.G.,Feitosa,L.M.,ePadua,V.P.,&Pereira,A.G.(2023).Estudodosrecalquesprimáriosemumaterroexecutadosobreaargilamoledo Sarapuí.BrazilianJournalofDevelopment,9(10),28352–28375.https://doi.org/10.34117/bjdv9n10059

21. PESSOA,E.G.;FEITOSA,L.M.;PEREIRA,A.G.;EPADUA,V.P.Efeitosdeespéciesdealnaeficiênciadecoagulação,Alresidualepropriedadedosflocosnotratamentodeáguassuperficiais.BrazilianJournalofHealthReview,[S.l.],v.6,n.5,p.2481424826,2023.DOI:10.34119/bjhrv6n5523.Disponívelem:https://ojs.brazilianjournals.com.br/ojs/index.php/BJHR/article/view/63890.Acessoem:25jan.2025.

22. SANTOS,Hugo;PESSOA,EliomarGotardi.Impactsofdigitalizationontheefficiencyandqualityofpublicservices:Acomprehensiveanalysis.LUMENETVIRTUS,[S.l.],v.15,n.40,p.44094414,2024.DOI:10.56238/levv15n40024.Disponívelem:https://periodicos.newsciencepubl.com/LEV/article/view/452.Acessoem:25jan.2025.

23. Filho, W. L. R. (2025). The Role of Zero Trust Architecture in Modern Cybersecurity: Integration with IAM and Emerging Technologies. *Brazilian Journal of Development*, *11*(1), e76836. https://doi.org/10.34117/bjdv11n1-060

24. Oliveira, C. E. C. de. (2025). Gentrification, urban revitalization, and social equity: challenges and solutions. *Brazilian Journal of Development*, *11*(2), e77293. https://doi.org/10.34117/bjdv11n2-010

25. Pessoa, E. G. (2024). Pavimentos permeáveis uma solução sustentável. *Revista Sistemática*, *14*(3), 594–599. https://doi.org/10.56238/rcsv14n3-012

26. Filho, W. L. R. (2025). THE ROLE OF AI IN ENHANCING IDENTITY AND ACCESS MANAGEMENT SYSTEMS. *International Seven Journal of Multidisciplinary*, *1*(2). https://doi.org/10.56238/isevmjv1n2-011

27. Antonio, S. L. (2025). Technological innovations and geomechanical challenges in Midland Basin Drilling. Brazilian Journal of Development, 11(3), e78097. https://doi.org/10.34117/bjdv11n3-005

28. Pessoa, E. G. (2024). Pavimentos permeáveis uma solução sustentável. *Revista Sistemática*, *14*(3), 594–599. https://doi.org/10.56238/rcsv14n3-012

29. Eliomar Gotardi Pessoa, & Coautora: Glaucia Brandão Freitas. (2022). ANÁLISE DE CUSTO DE PAVIMENTOS PERMEÁVEIS EM BLOCO DE CONCRETO UTILIZANDO BIM (BUILDING INFORMATION MODELING). Revistaft, 26(111), 86. https://doi.org/10.5281/zenodo.10022486

30. Eliomar Gotardi Pessoa, Gabriel Seixas Pinto Azevedo Benittez, Nathalia Pizzol de Oliveira, & Vitor Borges Ferreira Leite. (2022). ANÁLISE COMPARATIVA ENTRE RESULTADOS EXPERIMENTAIS E TEÓRICOS DE UMA ESTACA COM CARGA HORIZONTAL APLICADA NO TOPO. Revistaft, 27(119), 67. https://doi.org/10.5281/zenodo.7626667

31. Eliomar Gotardi Pessoa, & Coautora: Glaucia Brandão Freitas. (2022). ANÁLISE COMPARATIVA ENTRE RESULTADOS TEÓRICOS DA DEFLEXÃO DE UMA LAJE PLANA COM CARGA DISTRIBUÍDA PELO MÉTODO DE EQUAÇÃO DE DIFERENCIAL DE LAGRANGE POR SÉRIE DE FOURIER DUPLA E MODELAGEM NUMÉRICA PELO SOFTWARE SAP2000. Revistaft, 26(111), 43. https://doi.org/10.5281/zenodo.10019943

32. Pessoa, E. G. (2025). Optimizing helical pile foundations: a comprehensive study on displaced soil volume and group behavior. *Brazilian Journal of Development*, *11*(4), e79278. https://doi.org/10.34117/bjdv11n4-047

33. Pessoa, E. G. (2025). Utilizing recycled construction and demolition waste in permeable pavements for sustainable urban infrastructure. *Brazilian Journal of Development*, *11*(4), e79277. https://doi.org/10.34117/bjdv11n4-046

34. Testoni, F. O. (2025). Niche accounting firms and the brazilian immigrant community in the U.S.: a study of cultural specialization and inclusive growth. *Brazilian Journal of Development*, *11*(5), e79627. https://doi.org/10.34117/bjdv11n5-034

35. Silva, J. F. (2025). Desafios e barreiras jurídicas para o acesso à inclusão de crianças autistas em ambientes educacionais e comerciais. *Brazilian Journal of Development*, *11*(5), e79489. https://doi.org/10.34117/bjdv11n5-011

36. POURRE, Carlla Brito Furlan. (2020). **Indicadores de Resultados Finalísticos como Instrumento de Diagnóstico do Transporte Urbano: Um Estudo de Caso do Distrito Federal.** Dissertação de Mestrado em Arquitetura e Urbanismo, Programa de Pós-Graduação em Arquitetura e Urbanismo, Faculdade de Arquitetura e Urbanismo, Universidade de Brasília, Brasília, DF, 167p. Disponível em: https://repositorio.unb.br/handle/10482/38743.

37. FURLAN, Carlla Brito; SANTOS, Gleys Ially Ramos dos. 2016. **A qualidade do transporte público urbano em cidades médias: estudo de caso em Palmas-Tocantins.** Revista em Gestão, Inovação e Sustentabilidade. Disponível em: chrome-

extension://efaidnbmnnnibpcajpcglclefindmkaj/https://editora.iabs.org.br/site/wp-content/uploads/2018/01/ReGis-Dez-16-1.pdf.

38. POURRE, Carlla Brito Furlan. MAGALHÃES, Marcos Thadeu Queiroz; ROCHA Marecilda; Mello, Cristina de. 2022. **Desempenho Urbano em uma Cidade Planejada (Palmas-To): Uma Leitura pela Sintaxe Espacial.** Conference: Anais do Encontro Nacional da Associação Nacional de Pós Graduação e Pesquisa em Planejamento Urbano e Regional - XIX ENCONTRO NACIONAL DA ANPUR. Blumenau- SC. Disponível em: http://repositorio2.unb.br/jspui/handle/10482/47875.

39. MOYSÉS, David de Almeida; FERNANDES, Jorge Henrique Cabral; HOSOUME, Juliana Mayuni; PIÑA, Ana Beatriz Souza; BERNARDES, Marciele Berger; BAUCHSPIESS, Adolfo; POURRE, Carlla Brito Furlan; CARVALHO, Michele Tereza Marques; GARCIA, Luís Paulo Faina; BORGES, Geovany Araújo. 2022. **Iniciativas experimentais.** CESUs: Centros de Eficiência em Sustentabilidade Urbana (Livro) – Volume II: Aplicações. Editora Ecos. Disponível em: https://repositorio.ecos.unb.br/exhibits/show/editoraecos/item/554#?c=&m=&s=&cv=.

40. POURRE, Carlla Brito Furlan, MOYSÉS, David de Almeida, MAGALHÃES, Marcos Thadeu Queiroz, FERNANDES, Jorge Henrique Cabral Fernandes. 2022. **Processos finalísticos de um CESU.** CESUs: Centros de Eficiência em Sustentabilidade Urbana (Livro) Volume III: Proposições e Perspectivas. Editora Ecos. Disponível em: https://repositorio.ecos.unb.br/exhibits/show/editoraecos/item/563#?c=&m=&s=&cv=.

41. MAGALHÃES, Marcos Thadeu Queiroz; POURRE, Carlla Brito Furlan. 2022. **Planejamento e smart cities.** In: CESUs: Centros de Eficiência em Sustentabilidade Urbana (Livro) – Volume I: Fundamentos. Editora Ecos. Disponível em: https://repositorio.ecos.unb.br/exhibits/show/editoraecos/item/562#?c=&m=&s=&cv=.

42. Poure, C. B. F. (2024). UMA ANÁLISE BIBLIOMÉTRICA DA PESQUISA DE FRAMEWORK DE CIDADES INTELIGENTES. *Revista Sistemática*, *14*(8), 591–605. https://doi.org/10.56238/rcsv14n8-009

43. Brito Furlan, C. ., & Ially Ramos dos Santos, G. . (2019). A Qualidade do Transporte Público Urbano em Cidades Médias: Estudo de Caso em Palmas – Tocantins. *arq.Urb*, (17), 75–88. Recuperado de https://revistaarqurb.com.br/arqurb/article/view/177

44. MELLO, Cristina Maria Correia de et al.. LOCALIZAÇÃO, ENCONTROS E ESQUIVANÇAS NOS CONJUNTOS HABITACIONAIS DO PMCMV: UM OLHAR SOBRE UMA EXPERIÊNCIA NO DISTRITO FEDERAL.. In: Anais do 5º Fórum HABITAR 2019: Habitação e Desenvolvimento Sustentável. Anais...Belo Horizonte(MG) UFMG, 2019. Disponível em: https//www.even3.com.br/anais/forumhabitar2019/197679-LOCALIZACAO-ENCONTROS-E-ESQUIVANCAS-NOS-CONJUNTOS-HABITACIONAIS-DO-PMCMV--UM-OLHAR-SOBRE-UMA-EXPERIENCIA-NO-DIST. Acesso em: 26/05/2025

45. Silva, J. F. (2024). SENSORY-FOCUSED FOOTWEAR DESIGN: MERGING ART AND WELL-BEING FOR INDIVIDUALS WITH AUTISM. International Seven Journal of Multidisciplinary, 1(1). https://doi.org/10.56238/isevmjv1n1-016