



International KES Conference on Intelligent Decision Technologies

KESIDT 2023: **Intelligent Decision Technologies** pp 157–170

[Home](#) > [Intelligent Decision Technologies](#) > Conference paper

Evaluation Instrument for Pre-implementation of Lean Manufacturing in SMEs Using the Paraconsistent Annotated Evidential Logic $E\tau$ Evaluation Method

[Nilton Cesar França Teles](#) , [Jair Minoro](#)

[Abe, Samira Sestari do Nascimento](#) &

[Cristina Corrêa de Oliveira](#)

Conference paper |

[First Online: 30 May 2023](#)

68 Accesses

Part of the [Smart Innovation, Systems and Technologies](#) book series (SIST, volume

Abstract

The Lean Manufacturing methodology provides competitive advantages, greater productivity, better product quality, customer and worker satisfaction. This research aims to develop an evaluation instrument to be used by consultants in the evaluation of Lean Manufacturing concepts by employees of a company. This instrument uses indicators defined in the literature, in order to improve the implementation of Lean Manufacturing in small and medium-sized companies, which do not benefit from this implementation due to the lack of methods that assess how much they are prepared for the process. This article presents the results of an evaluation simulation of assimilation of these indicators using

the Paraconsistent Annotated Evidential Logic Et . The results showed that measuring the participants' degree of assimilation of Lean Manufacturing concepts and tools can improve the success of Lean Manufacturing implementation in small and medium-sized companies.

Keywords

Lean Manufacturing

Paraconsistent Logic

Implementation

Non-Classical Logic Framework

This is a preview of subscription content, [access via your institution](#).

▼ Chapter

USD 29.95

Price excludes VAT (Brazil)

- Available as PDF
- Read on any device
- Instant download
- Own it forever

Buy Chapter

▼ eBook

USD 299.00

Price excludes VAT (Brazil)

- Available as EPUB and PDF
- Read on any device
- Instant download
- Own it forever

Buy eBook

▼ Hardcover Book

USD 379.99

Price excludes VAT (Brazil)

- Durable hardcover edition
- Dispatched in 3 to 5 business days
- Free shipping worldwide - [see info](#)

Buy Hardcover Book

Tax calculation will be finalised at checkout

Purchases are for personal use only

[Learn about institutional subscriptions](#)

References

1. Henao, R., Sarache, W., Gómez, I.: Lean manufacturing and sustainable performance: trends and future challenges. *J. Clean. Prod.* **208**, 99–116 (2019)
-

2. Jadhav, J.R., Mantha, S.S., Rane, S.B.: Exploring barriers in lean implementation. *Int. J. Lean Six Sigma* **5**(2), 122–148 (2014).
<https://doi.org/10.1108/IJLSS-12-2012-0014>

3. Gandhi, N.S., Thanki, S.J., Thakkar, J.J.: Ranking of drivers for integrated lean-green manufacturing for Indian manufacturing SMEs. *J. Clean. Prod.* **171**, 675–689 (2018).
<https://doi.org/10.1016/j.jclepro.2017.10.041>

4. Hofer, C., Eroglu, C., Hofer, A.R.: The effect of lean production on financial performance: the mediating role of inventory leanness. *Int. J. Prod. Econ.* **138**(2), 242–253 (2012).

<https://doi.org/10.1016/j.ijpe.2012.03.025>

5. Yadav, G., Luthra, S., Huisingh, D., Mangla, S.K., Narkhede, B.E., Liu, Y.: Development of a lean manufacturing framework to enhance its adoption within manufacturing companies in developing economies. *J. Clean. Prod.* **245**, 118726 (2020)

6. Abe, J.M. (ed.): *Paraconsistent Intelligent-Based Systems*. ISRL, vol. 94. Springer, Cham (2015).
<https://doi.org/10.1007/978-3-319-19722-7>

7. Womack, J.P., Jones, D.T.: *Beyond Toyota: How to root out waste and pursue perfection*. *Harvard Bus. Rev.* **74**, 140–151 (1996)

8. Da Costa, N.C.A.: ea: Lógica Paraconsistente Aplicada (Applied paraconsistent logic). Atlas, Sao Paulo **7**, 25 (1999)

9. de Carvalho, G.D.G., et al.: Bibliometrics and systematic reviews: a comparison between the Proknow-C and the Methodi Ordinatio. J. Inf. **14**, 101043 (2020)

10. Ensslin, L., Ensslin, S.R., Lacerda, R.T.D.O., Tasca, J.E.: ProKnow-C, Knowledge Development Process–Constructivist: processo técnico com patente de registro pendente junto ao INPI. Brasil **21**, 54–66 (2010)

11. AlManei, M., Salonitis, K., Xu, Y.: Lean implementation frameworks: the challenges for SMEs. In: Manufacturing Systems

4.0, Sara Burgerhartstraat 25, Po
Box 211, 1000 Ae Amsterdam,
Netherlands (2017)

12. Alkhoraif, A.A., McLaughlin, P.,
Rashid, H.: A framework to
improve lean implementation by
review leveraging aspects of
organisational culture: the case
of Saudi Arabia. *Int. J. Agile Syst.
Manag.* **12**, 124–179 (2019)

13. Moeuf, A., Tamayo, S., Lamouri,
S., Pellerin, R., Lelievre, A.:
Strengths and weaknesses of
small and medium sized
enterprises regarding the
implementation of lean
manufacturing. *Ifac Papersonline*
49, 71–76 (2016)

14. Rose, A.N.M., Deros, B.M.,
Rahman, M.N.A.: Critical success

factors for implementing lean manufacturing in Malaysian automotive industry. Res. J. Appl. Sci. Eng. Technol. **8**, 1191–1200 (2014)

15. Elkhairi, A., Fedouaki, F., El Alami, S.: Barriers and critical success factors for implementing lean manufacturing in SMEs. Ifac Papersonline **52**, 565–570 (2019)

16. Mohammad, I.S., Oduoza, C.F.: Lean-excellence business management for manufacturing SMEs focusing on KRI. Int. J. Prod. Perf. Manag. **69**, 519–539 (2020)

17. Rose, A.N.M., Ab Rashid, M.F.F., Nik Mohamed, N.M.Z., Ahmad, H.: Similarities of lean manufacturing approaches

implementation in SMEs towards the success: case study in the automotive component industry.

In: 9th International Unimas Stem Engineering Conference (Encon 2016) Innovative Solutions For Engineering And Technology Challenges, 17 Ave Du Hoggar Parc D Activites Coutaboef Bp 112, F-91944 Cedex A, France (2017)

18. Abu, F., et al.: An SEM approach for the barrier analysis in lean implementation in manufacturing industries. Sustainability **13**(4), 1978 (2021). <https://doi.org/10.3390/su13041978>

19. Ravikumar, M.M., Marimuthu, K., Parthiban, P., Abdul Zubar, H.: Critical issues of lean

implementation in Indian micro, small and medium enterprises- an analysis. *Res. J. Appl. Sci. Eng. Technol.* **7**, 2680–2686 (2014)

20. Inuwa, M., Rahim, S.B.A.: Lean readiness factors and organizational readiness for change in manufacturing SMEs: the role of organizational culture. *J. Crit. Rev.* **7**, 56–67 (2020)

21. Yuik, C.J., Perumal, P.A., Feng, C.J.: Exploring critical success factors for the implementation of lean manufacturing in machinery and equipment SMEs. *Eng. Manag. Prod. Serv.* **12**, 77–91 (2020)

22. Demirbas, D., Holleville, L., Bennett, D.: Evaluation and

comparison of lean manufacturing practices in britain and france: a case study of a printing solutions organisation. *J. Econ. Cult. Soc.* **57**, 93–150 (2018)

23. Qureshi, K.M., Bhavesh, G., Mewada, S.Y., Alghamdi, N.A., Mohamed, R.N., Qureshi, M.M.: Accomplishing sustainability in manufacturing system for small and medium-sized enterprises (smes) through lean implementation. *Sustainability* **14**(15), 9732 (2022).
<https://doi.org/10.3390/su14159732>

24. Maware, C., Parsley, D.M.: The challenges of lean transformation and implementation in the

manufacturing sector.

Sustainability **14**(10), 6287

(2022).

<https://doi.org/10.3390/su14106287>

25. Arteaga Sarmiento, W.J., Villamil Sandoval, D.C., Jesus Gonzalez, A.: Characterization of the production processes of textile SMEs in Cundinamarca. Logos Ciencia & Tecnologia 11, 60–77 (2019)

26. Mendes, A., Lima, T.M., Gaspar, P.D.: Lean tools selector - a decision support system. In: 2021 International Conference On Decision Aid Sciences And Application (Dasa), 345 E 47th St, New York, Ny 10017 USA (2021)

27. Grant, J.S., Davis, L.L.: Selection and use of content experts for instrument development. Res. Nurs. Health **20**, 269–274 (1997)

Acknowledgement

This study was supported partially by the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior - Brasil (CAPES) - Finance Code 001 Number Process 88887.663537/2022–00.

Author information

Authors and Affiliations

Paulista University, São Paulo,

Brazil

Nilton Cesar França Teles, Jair Minoro

Abe, Samira Sestari do

Nascimento & Cristina Corrêa de

Oliveira

Corresponding author

Correspondence to [Nilton Cesar Frana Teles](#).

Editor information

Editors and Affiliations

**Gdynia Maritime University,
Gdynia, Poland**

Ireneusz Czarnowski

**KES International Research,
Shoreham-by-sea, UK**

R.J. Howlett

KES International, Selby, UK

Lakhmi C. Jain

Rights and permissions

[Reprints and Permissions](#)

Copyright information

© 2023 The Author(s), under
exclusive license to Springer Nature
Singapore Pte Ltd.

About this paper

Cite this paper

Teles, N.C.F., Abe, J.M., do Nascimento, S.S., de Oliveira, C.C. (2023). Evaluation Instrument for Pre-implementation of Lean Manufacturing in SMEs Using the Paraconsistent Annotated Evidential Logic $\text{E}\tau$ Evaluation Method. In: Czarnowski, I., Howlett, R., Jain, L.C. (eds) Intelligent Decision Technologies. KESIDT 2023. Smart Innovation, Systems and Technologies, vol 352. Springer, Singapore. https://doi.org/10.1007/978-981-99-2969-6_14

[.RIS](#)  [.ENW](#)  [.BIB](#) 

DOI	Published	Publisher
https://doi.org/10.1007/978-981-99-2969-6_14	30 May 2023	Name Springer, Singapore

Print ISBN	Online ISBN	eBook
978-981-99-2968-9	978-981-99-2969-6	Packages Intelligent Technologies and Robotics

Intelligent
Technologies
and Robotics
(R0)