The use of Lean Manufacturing practices in Cleaner Production: a systematic review

Agenda

1. Team and research
2. Introduction
3. Literature review
4. Research method
5. Results
6. Conclusion
7. Further development
8. Publications
9. Bibliography
Team and research

Students
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- Raphael Cobra
- Mariana Guardia
- José Augusto Oliveira

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- Kleber Esposto
- Aldo Ometto

SLR LM and CP Tools

SLR LM and CP

LM Background

CP Background
Introduction

• Sustainability value
• The association of Lean Manufacturing and environmental strategies is claimed to respond to this demand
• “what Lean tool are associated with this value delivery”
Literature Review

- Lean Manufacturing
- Cleaner production
- Lean and Green
Research Method

- SLR aims to assess and collect the existing evidence in the literature on the research subject
- Method recorded in a protocol
- The process went from 918 studies to 90 than to 13 increasing the level of relevance
## Results

<table>
<thead>
<tr>
<th>ID</th>
<th>Título</th>
<th>Autores</th>
<th>Ano</th>
<th>Tipo de Estudo</th>
<th>Ferramentas Lean</th>
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<tbody>
<tr>
<td>1</td>
<td>A case study of lean, sustainable manufacturing</td>
<td>Miller, G. Pawloski, J. Standridge, C.</td>
<td>2010</td>
<td>Case study</td>
<td>Kaizen</td>
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<td>2</td>
<td>Assessment of the Lean Production Effect on the Sustainable Industrial Enterprise Development</td>
<td>Dakov, I Novkov, S.</td>
<td>2007</td>
<td>Theory</td>
<td>Performance Indicators</td>
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<td>3</td>
<td>Case Study: Honda of America Manufacturing, Inc.: Can Lean Production Practices Increase Environmental Performance?</td>
<td>Maxwell, J. Briscoe, F. Schenk, B. Rothenberg, S.</td>
<td>1998</td>
<td>Case study</td>
<td>Multifunctional operator; visual management</td>
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<td>5</td>
<td>Model of efficient and sustainable improvements in a lean production system through processes of environmental innovation</td>
<td>Aguado, S. Alvarez, R Domingo, R</td>
<td>2012</td>
<td>Case study</td>
<td>VSM and pull production</td>
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<td>6</td>
<td>Pollution burdens associated with load assemble pack of an AP based MK-66 PIP motor by continuous batch processing</td>
<td>Graham, A. Reardon P. T.</td>
<td>1997</td>
<td>Case study</td>
<td>Continuous flow</td>
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<td>7</td>
<td>Reducing carbon emissions in precast concrete production through the lean production philosophy</td>
<td>Peng, W.</td>
<td>2010</td>
<td>Case study</td>
<td>Layout and Just-in-Time</td>
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<td>8</td>
<td>Tools and techniques for enabling sustainability through lean initiatives</td>
<td>Vinodh S. Arvind K. R. Somanaathan M.</td>
<td>2011</td>
<td>Theory</td>
<td>Pull production, cell manufacturing, VSM, 5s, TPM, kaizen, visual management, poka yoke.</td>
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<td>9</td>
<td>Using lean methodologies for economically and environmentally sustainable foundries</td>
<td>Torielli, R. M. Abrahams, R. A. Smillie, R.W. Voigt, R.C.</td>
<td>2010</td>
<td>Theory</td>
<td>VSM and 5s</td>
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<td>10</td>
<td>Lean Processes for Sustainable Project Delivery</td>
<td>LAPINSKI, A. R. HORMAN, M. J. RILEY, D. R.</td>
<td>2007</td>
<td>Case study</td>
<td>Kaizen</td>
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<td>11</td>
<td>Integration Of Lean And Green Supply Chain - Impact On Manufacturing Firms In Improving Environmental Efficiencies</td>
<td>PARVEEN, C. M. KUMAR, A. R. P. RAO, T. V. V. L. N.</td>
<td>2011</td>
<td>Survey</td>
<td>JIT,Kaizen,Kanban, TPM,VSM, 5S e cell manufacturing</td>
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<td>12</td>
<td>Lean construction implementation and its implication on sustainability: a contractor’s case study</td>
<td>SONG, L. LIANG, D.</td>
<td>2011</td>
<td>Case study</td>
<td>Visual maagement, Pull production and operator training</td>
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<td>13</td>
<td>Lean and Green at a Romanian secondary tissue paper and board mill - putting theory into practice</td>
<td>Vais, A. Miron, V. Pedersen, M. Folke, J.</td>
<td>2006</td>
<td>Case study</td>
<td>JIT,Kaizen, TPM 5S e cell manufacturing</td>
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Conclusion

- Many tools used by Lean Manufacturing can be used for obtaining environmental benefits.
- Practices found:
  - Kaizen
  - VSM
  - Pull Production
  - Manufacturing Mobile
  - TPM
  - JIT
  - Performance Indicators
  - Multifunctional Worker
  - Continuous Flow
  - Layout
  - Poka Yoke
  - Kanban
  - Visual Management
  - Labor Training

- Major practices: Kaizen was mentioned, in 5 studies; VSM was mentioned in 4 studies
- The method was adequate
Further Development

This work

• Classify the types of use of each tool/practice: application, customization, etc
• Add new studies from the SLR to the sample

Other works

• Measure quantitative impact reduction from lean tools/practices
Publications

Published

The adoption of Systematic Literature Review in production engineering: an analysis in the annals of ENEGEP - Mariana Guardia, Geandra Alves Queiroz, Raphael Laraia Rocha de Barros Cobra, José Augusto de Oliveira, Daniel Capaldo Amaral

Identify the benefits and difficulties of cleaner production in industrial enterprises of the state of São Paulo - José Augusto de Oliveira, Raphael Laraia Rocha de Barros Cobra, Mariana Guardia, Otavio Jose de Oliveira, Aldo Roberto Ometto

Proposal for Cleaner Production Deployment using the DMAIC method
Geandra Alves Queiroz, José Augusto de Oliveira, Mariana Guardia, Raphael Laraia Rocha de Barros Cobra, Kleber Francisco Esposto

Accepted


Bibliography


Thank you