

The copyright © of this thesis belongs to its rightful author and/or other copyright owner. Copies can be accessed and downloaded for non-commercial or learning purposes without any charge and permission. The thesis cannot be reproduced or quoted as a whole without the permission from its rightful owner. No alteration or changes in format is allowed without permission from its rightful owner.



**THE EFFECT OF LEAN MANUFACTURING TOWARDS
FINANCIAL PERFORMANCE AT HICOM AUTOMOTIVE
MANUFACTURERS, PEKAN, PAHANG.**



MASTER OF SCIENCE
UNIVERSITI UTARA MALAYSIA
JANUARY 2017

**THE EFFECT OF LEAN MANUFACTURING TOWARDS FINANCIAL
PERFORMANCE AT HICOM AUTOMOTIVE MANUFACTURERS, PEKAN,
PAHANG.**

By

NOR RIFHAN BINTI HASHIM



UUM
Universiti Utara Malaysia

Thesis Submitted to

School of Business Management,

Universiti Utara Malaysia,

In Partial Fulfillment of the Requirement for the Master of Science (Management)

PERMISION TO USE

In presenting this thesis in fulfillment of the requirements for a Post Graduate degree from the Universiti Utara Malaysia (UUM), I agree that the Library of this university may make it freely available for inspection. I further agree that permission for copying this thesis in any manner, in whole or in part, for scholarly purposes may be granted by my supervisor or in their absence, by the Dean of School of Business Management. It is understood that any copying or publication or use of this thesis or parts of it for financial gain shall not be allowed without my written permission. It is also understood that due recognition shall be given to me and to the UUM in any scholarly use which may be made of any material in my thesis.

Request for permission to copy or to make other use of materials in this thesis in whole or in part should be addressed to:

Dean of School of Business Management

Universiti Utara Malaysia

06010 UUM Sintok

Kedah Darul Aman

Abstract

Lean manufacturing plays an important role in improving employee performance and increase financial performance. This study an exploratory the relationship between the effects of lean manufacturing implementation on the financial performance. Lean manufacturing is to help the firm improve their financial performance due to this exercise can give a variety of new benefits such as cost savings, and time. In this age of development now, many firms are struggling to improve their performance along with the development of the industry, especially in the industrial and automotive industries. Therefore, this study is to prove that this relationship does actually have a positive effect on the development of the company's performance. This study was conducted in Hicom Automotive, Pekan, Pahang. This study is based on quantitative methods and using a questionnaire as a tool to collect data which has been developed by a number of instruments from previous studies. Respondents who participated in this study were employees in the management as well as human resources and finance. The respondents were 108 workers. In this study, researchers used SPSS 19 to analyze the data to measure the influence and strength of the relationship between the independent variables. Through this study, the results obtained is the relationship between lean manufacturing and the company's performance also have a positive relationship. Thus, through this study can be said lean manufacturing is something that can help improve the company's performance.

Keywords: *Lean Manufacturing, Financial Performance, Automotive Industry.*

Abstrak

Pembuatan Lean memainkan peranan penting dalam meningkatkan prestasi pekerja dan seterusnya meningkatkan prestasi kewangan. Kajian ini adalah untuk mengkaji hubungan antara kesan pelaksanaan pembuatan lean terhadap prestasi kewangan yang dilakukan. Pembuatan lean dikatakan mampu membantu sesebuah firma meningkatkan prestasi kewangan mereka kerana dengan pelaksanaan ini dapat memberi pelbagai faedah baru seperti dapat menjimatkan kos dan masa. Dalam zaman pembangunan kini, banyak firma yang bertungkus lumus meningkatkan prestasi masing-masing seiring dengan perkembangan sesebuah industri terutama dalam industri perindustrian dan automotif. Justeru itu, kajian ini adalah untuk membuktikan bahawa adakah kaitan ini benar-benar memberi kesan positif terhadap perkembangan kewangan syarikat. Kajian ini dilakukan di Hicom Automotive, Pekan, Pahang. Kajian ini dijalankan berdasarkan kaedah kuantitatif dan menggunakan soalan kaji selidik sebagai alat untuk mengumpul data yang telah dibangunkan berdasarkan beberapa instrumen daripada kajian terdahulu. Responden yang terlibat dalam kajian ini adalah pekerja di bahagian pengurusan seperti bahagian sumber manusia dan juga kewangan. Responden yang terlibat adalah seramai 108 orang pekerja. Dalam kajian ini, penyelidik menggunakan SPSS 19 untuk menganalisis data untuk mengukur pengaruh dan kekuatan hubungan antara pemboleh ubah. Melalui kajian ini, keputusan yang didapati adalah hubungan antara pembuatan lean dan juga prestasi kewangan mempunyai hubungan positif. Justeru itu, melalui kajian ini boleh dikatakan pembuatan lean merupakan sesuatu yang mampu membantu meningkatkan prestasi kewangan syarikat.

Kata kunci: *Pembuatan Lean, Prestasi kewangan, Industry Automotif.*

ACKNOWLEDGEMENT

Praise to ALLAH SWT the Almighty for his love and blessing that make me move forward to complete this journey. This dissertation would have been written constant without support, guidance and assistance from many people. Firstly, my deepest gratitude goes to my supervisor, Dr. Martino Luis for his patience, guidance, commences and encouragement that he has given me along this journey. I am deeply indebted for his time, passion, dedication, support and help me to give the right way to write a thesis, and that was the important thing that I've learned from him. This research also would not have been successful without full commitment and participation from the respondent as the expert for the survey. I would like to gratitude for their time and corporation to answer the questionnaire. Thank you to Hicom Automotive employees. Next, the special thank you goes to the people that always give me support that is my husband Abd Aziz bin Abdullah and my parents Hashim Jamhari and my mother Jamiayah binti Hashim. This special thank you also to my daughter Nuha Alisya binti Abd Aziz because support your mom as long my thesis journey. To my sibling also that always give me support and motivation to finish these theses. Last but not least, I am particularly grateful to my colleagues, friend and course mates that also help me through this research paper. A special thank you for their support, commitment and understanding in helping me pull through this course.

TABLE OF CONTENTS

PERMISSION TO USE	ii
ABSTRACT	iii
ABSTRAK	iv
ACKNOWLEDGEMENT	v
TABLE OF CONTENTS	vi
LIST OF TABLES	ix
LIST OF FIGURES	xi
CHAPTER 1:INTRODUCTION	
1.1 Background of Study	1
1.2 Problem Statement	6
1.3 Research Question	7
1.4 Research Objectives	8
1.5 Significant of study	8
1.6 Scope and limitation of study	9
1.7 Organization of the thesis	9
CHAPTER 2: LITERATURE REVIEW	
2.1 Financial Performance	10
2.2 Lean Manufacturing	11
2.2.1 Just-in-time flow	22
2.2.2 Quality management	23

2.2.3	Employee involvement	24
2.3	Lean Manufacturing and financial Performance	24
2.4	Success Factors in Lean Implementation	25
2.4.1	Planning the change	26
2.5	Advantages and Risks of Lean Production	27
2.6	Previous Research	30
 CHAPTER 3: RESEARCH METHODOLOGY		
3.1	Research Framework	34
3.2	Hypotheses Development	35
3.3	Population and Sampling Technique	36
3.4	Data Collection Method	36
3.5	Questionnaire Design	38
3.6	Measurement of Variables	39
3.6.1	Lean Manufacturing Management and Financial Performances	39
3.7	Data Analysis Technique	39
3.7.1	Descriptive Statistics	40
3.7.2	ANOVA Analysis	40
3.7.3	Correlation Analysis	41
3.7.4	Regression Analysis	41
3.8	Pilot Study	42
3.8.1	Reliability Coefficient	43

CHAPTER 4: RESULTS AND DISCUSSION

4.1	Response Rate	46
4.2	Analysis of Respondents	47
4.2.1	Respondents' Gender	47
4.2.2	Respondents' Race	48
4.2.3	Respondents' Age	48
4.2.4	Respondents' Qualification	49
4.2.5	Respondents' Position Level	50
4.2.6	Respondents' Working Experience	51
4.3	Company Profile	52
4.3.1	Ownership of company	52
4.3.2	Average sale per year for the last 3 years	53
4.3.3	Average profit per year for the last 3 years	54
4.4	Regression Analysis	55

CHAPTER 5 : CONCLUSION AND RECOMMENDATION

5.1	Conclusions	66
5.2	Managerial Implication	66
5.3	Limitation of study and future research direction	67

REFERENCES	70
------------	----

APPENDICES	78
------------	----

Appendix 1: Sample of Questionnaire

Appendix 2: Pilot Test Results

LIST OF TABLES

Table 2.1	Definition of Lean Manufacturing	13
Table 2.2	Variables definition and supporting literature	18
Table 2.3	Time line marking the critical phases in the lean manufacturing evolution	19
Table 2.4	Advantages and Risks of Lean Production	27
Table 2.5	Sample of Journal Reviews	31
Table 3.1	Determination of Sample Size of Population	37
Table 3.2	The Description of Questionnaire Section	38
Table 3.3	Coefficient Correlation	41
Table 3.4	Rules of Thumb about Cronbach's Alpha Coefficient Size	42
Table 3.5	Reliability Coefficient of Variables	43
Table 3.6	Corrected Item-Total Correlation Values	44
Table 3.7	Correlation of variable	45
Table 4:1	Respondents' Gender	47
Table 4.2	Respondents' Race	48
Table 4.3	Respondents' Age	49
Table 4.4	Respondents' Qualification	49
Table 4.5	Respondent's Position Level	50
Table 4.6	Respondents' Working Experience	51
Table 4.7	Ownership of the company percentage	52
Table 4.8	Average sales per year for the last 3 years	53

Table 4.9	Average profit per year for the last 3 years	54
Table 4.10	Model summary of Just-in -time on financial performance	55
Table 4.11	ANOVA of Just in time (JIT) on Financial Performance	56
Table 4.12	Coefficients of Just in Time (JIT) on Financial performance	57
Table 4.13	Model Summary of Quality Management (QM) on financial performance	57
Table 4.14	ANOVA of Quality Management (QM) on Financial performance	58
Table 4.15	Coefficients of Quality Management (QM) on Financial performance	59
Table 4.16	Model Summary of Employee Involvement (EI) on Financial performance	60
Table 4.17	ANOVA of Employee Involvement (EI) on Financial performance	60
Table 4.18	Coefficients of Employee Involvement (EI) on Financial performance	61
Table 4.19	Model Summary of Lean Manufacturing on Financial performance	62
Table 4.20	ANOVA of Lean Manufacturing on Financial performance	62
Table 4.21	Coefficients of Lean Manufacturing on Financial Performance	63
Table 5.1	Summary R-square lean management toward financial performance	66

LIST OF FIGURES

Figure 2.1	Research Model by Yang et al., (2011)	25
Figure 2.2	Model of Lean implementation process	26
Figure 3.1	Theoretical framework for financial performance	35



CHAPTER 1

INTRODUCTION

This chapter presents the background of the study, company profile, problem statement, followed by the research objectives, significant of study, scope and limitation of study, and finally the organization of the thesis.

1.1 Background of Study

Manufacturing industries have extensive involvement, especially in the manufacture and processing of goods and enjoy either the creation of a new commodity or as an additional value. The manufacturing industry accounted for most of the industrial sector in the developed countries. In the manufacturing industry the resulting end product can be either ready to be sold directly to customers or as intermediate goods or work in the processes used in the production process.

Manufacturing is the production of goods to be used or sold for labor or machinery that refers to a range of human activity, from handicraft to high tech, but is most commonly used for industrial production, where raw materials are transformed into finished goods on a large scale. Manufacturing is commonly found in all types of economic systems, especially in the free market economy that usually directed toward the mass production of products for sale to consumers at a profit. While in a collectivist economy, the more frequently directed by the state to supply a centrally planned economy. In a mixed market

The contents of
the thesis is for
internal user
only

References

- Ahmad, A., Mehra, S., and Pletcher, M. (2004). The perceived impact of JIT implementation on firms' financial/growth performance. *Journal of Manufacturing Technology Management*, Vol. 15 No. 2, 118-30.
- Alukal, G. (2003). Create a lean, mean machine. *Quality Progress*, Vol. 36 No. 4, 29-34.
- Alves, A.C., Dinis-Carvalho, J. and Sousa, R.M. (2012). Lean production as promoter of thinkers to achieve companies' agility. *The Learning Organization*, Vol. 19 No. 3, 219-237.
- Anchanga, P. (2006). Critical success factor for lean implementation within SMEs. *Journal of Manufacturing Technology Management*, 17(4), 11-17.
- Balakrishnan, R., Linsmeier, T.J., and Venkatachalam, M. (1996). Financial benefits From JIT adoption: effects of customer concentration and cost structure. *The Accounting Review*, Vol. 71 No. 2, 183-205.
- Bhasin, S. & Burcher, P. (2006). Lean viewed as a philosophy. *Journal of manufacturing Technology Management*, Vol. 17 No. 1, 2006.
- Boyd, D. T., Kronk, L. A., and Boyd, S. C. (2006). Measuring the effects of lean manufacturing systems on financial accounting metrics using data envelopment analysis. *Investment Management and Financial Innovations*, Vol. 3 No. 4, 40-54.
- Browning, T.R., Heath, R.D., (2009). Conceptualizing the effects of lean on production costs with evidence from the F-22 program. *Journal of Operations Management* 27 (1), 23-44.
- Callen, J.L., Fader, C., and Krinsky, I. (2000). Just-in-time: a cross-sectional plant analysis. *International Journal of Production Economics*, Vol. 63 No. 3, 277-301.
- Christopher, M., Towill, D.R., (2000). Supply chain migration from lean and functional to agile and customized. *Supply Chain Management: An International Journal* 5(4), 206-213.
- Comm, C.L. and Mathaisel, D.F.X. (2000). A paradigm for benchmarking lean initiatives for quality Improvement. *Benchmarking: An International Journal*, Vol. 7 No. 2, 118-127.
- Cox, J.F. and Blackstone, J.H. (Eds) (1998). APICS Dictionary, 9th ed., *APICS-The Educational Society for Resource Management*, Falls Church, VA.

- Cooney, R. (2002). Is 'lean' a universal production system? Batch production in the automotive industry. *International Journal of Operations & Production Management*, Vol. 22 No. 10, 1130-1147.
- Cua, K.O., McKone, K.E., and Schroeder, R.G. (2001). Relationships between Implementation of TQM, JIT, and TPM and manufacturing performance. *Journal of Operations Management*, Vol. 19 No. 6, 675-94.
- De Treville, S. and Antonakis, J. (2006). Could lean production job design be intrinsically motivating? Contextual, configurational, and levels-of-analysis issues. *Journal of Operations Management*, Vol. 24 No. 2, 99-123.
- Devdas Shetty, Ahad Ali, Robert Cummings, (2010). Survey-based spreadsheet model on lean implementation. *International Journal of Lean Six Sigma*, Vol. 1 Iss: 4, 310- 334.
- Duque, D.F.M. & Cadavid, L.R. (2007). Lean Manufacturing Measurement: the Relationship between Lean Activities and Lean Metrics. *Estudios gerenciales*, 23(105), 69-83.
- Dr. Jevon Powell (2011). Employee Involvement. *Scontrino-Powell*
From: <http://www.scontrino-powell.com/2011/employee-involvement/>
- Eric Oscar Olsen, (2004). Lean Manufacturing Management: The Relationship Between Practice and Firm Level Financial Performance. *The Ohio State University*, 1.
- Eriksson, H., and Hansson, J (2003). The impact of TQM on financial performance. *Measuring Business Excellence* 7, Vol. 7 No. 1, 36-50.
- Eshna (2012). *Financial Performance-Understanding its Concepts and Importance*
From: <https://www.simplilearn.com/financial-performance-rar21-article>
- Fullerton, R. R., McWatters, C. S., & Fawson, C. (2003). An examination of the relationships between JIT and financial performance. *Journal of Operations Management*, 21(4), 383.
- Fullerton, R.R., McWatters, C.S., and Fawson, C. (2003). An examination of the Relationships between JIT and financial performance. *Journal of Operations Management*, Vol. 21 No. 4, 383-404.
- Fullerton, R.R., Wempe, W., (2009). Lean manufacturing, non-financial performance measures, and financial performance. *International Journal of Operations and Production Management* 29 (3), 214-240.

- Garcia-Alcaraz JL, Maldonado AA, Iniesta AA, Robles GC, Alor-Hernández G (2014). A systematic review/survey for JIT implementation. *Mexican maquiladoras as case study Comput Ind* 65(4):761-773.
- Hair, J. F., Money, A. H., Samouel, P. & Page, Mike. (2007). Research Method for Business. *John Wiley & Son Ltd., England*.
- Howton, S. D., Higgins, E. J., & Biggart, T. B. (2000). The information content of just-in time inventory system adoption announcement. *Journal of Business Finance & Accounting*, 27(5/6): 711.
- Holweg, M. (2007). The genealogy of lean production. *Journal of Operations Management*, Vol. 25No. 1, 420-437
- Hopp, W.P. and Spearman, M.L. (2004). "To pull or not to pull: what is the question?" *Manufacturing and Service Operations Management*, Vol. 6 No. 2, 133-148.
- Howell, G.A. (1999). What is lean construction-1999?. *Proceedings Seventh Annual Conference of the International Group for Lean Construction, University of California, Berkeley, CA, July 26-28*.
- Haque, B. and Moore, M.J. (2004). Measures of performance for lean product introduction in the aerospace industry. *Proceedings of the Institution of Mechanical Engineers Part B-Journal of Engineering Manufacture*, Vol. 218 No. 10, 1387-1398.
- Hallgren, M. and Olhager, J. (2009). Lean and agile manufacturing: external and internal drivers and performance outcomes. *International Journal of Operations & Production Management*, Vol. 29 No. 10, 976-999.
- Henry Ford (1863-1947). ProQuest, (2006). *Integrating Lean Manufacturing with Technology: Analyzing the Effects on Organizational Performance in Terms of Quality, Cost, and Response Time*, 1.
- Holweg, M. (2007). The genealogy of lean production. *Journal of Operations Management*, vol. 25, 420-437
- Hogg, T. M. (1993). Lean Manufacturing. *Human Systems Management*, 12, 1.
- Inman R. Anthony RS. Sale KW. Jr G, Whitten D (2011). Agile manufacturing: relation to JIT, operational performance and firm performance. *J Oper Manage* 29(4), 343-355.
- Kelly, M. (2012). Advantages & Disadvantages of Lean Production. Retrieved 20 December 2016, from http://www.ehow.com/about_5418429_advantages-disadvantages-lean-production.html.

- Krejeie, R.V. and Morgan, D.W. (1970). Determining Sample Size for Research. *Educational & Psychological Measurement*. 30. 607-610.
- Kinney, M.R., and Wempe, W.F. (2002). Further evidence on the extent and origins of JIT's profitability effects. *The Accounting Review*, Vol. 77 No. 1, 203-25.
- Kannan VR. Tan, K.C. (2005). Just in time, total quality management, and supply chain management: understanding their linkages and impact on business performance. *Omega* 33(20), 153-162.
- Li, S., Rao, S.S., Ragu-Nathan, T.S., Ragu-Nathan, B., (2005). Development and validation of a measurement instrument for studying supply chain management practices. *Journal of Operations Management* 23 (6), 618-641.
- Linderman, K., Schroeder, R.G., Choo, A., (2006). Six sigma: the role of goals in improvement teams. *Journal of Operations Management* 24 (6), 779-790.
- Lin, C., Chow, W.S., Madu, C.N., Kuei, C., Pei, Yu, P., (2005). A structural equation model of supply chain quality management and organizational performance. *International Journal of Production Economics* 96 (3), 355-365.
- Lathin, D. and Mitchell, R. (2001). Lean manufacturing: techniques, people and culture. *Quality Congress Proceedings, Milwaukee, WI, June, 26*.
- Lau, R.S.M. (2002). Competitive factors and their relative importance in the US Electronics and computer industries. *International Journal of Operations and Production Management*, Vol. 22 No. 1, 125-35.
- Liker, J.K. and Wu, Y.C. (2000). Japanese automakers, US suppliers and supply-chain superiority. *Sloan Management Review*, Vol. 42 No. 1, 81-93.
- McLachlin, R., (1997). Management initiatives and just-in-time manufacturing. *Journal of Operations Management* 15 (4), 271-292.
- Martinez, A. & Perez, M. (2001). Lean Indicators and Manufacturing Strategies. *International Journal of Operations & Production Management*, 21(11), 1433-1451.
- Menor, L.J., Kristal, M.M., Rosenzweig, E.D., (2007). Examining the influence of operational intellectual capital on capabilities and performance. *Manufacturing & Service Operations Management* 9 (4), 559-578.
- MacDuffie, J.P., (1995). Human resource bundles and manufacturing performance: Organizational logic and flexible production systems in the world auto industry. *Industrial & Labor Relations Review* 48 (2), 197-221.

- McKone, K.E., Schroeder, R.G., Cua, K.O., (1999). Total productive maintenance: a contextual view. *Journal of Operations Management* 17 (2), 123-144.
- MIT (2000). Transitioning to a lean enterprise: a guide for leaders, retrieved 20 December 2016 from <http://lean.mit.edu/Products/TTL/TTL-vol1.pdf>.
- Narasimhan, R., Kim, S.W., (2002). Effect of supply chain integration on the relationship between diversification and performance: evidence from Japanese and Korean firms. *Journal of Operations Management* 20 (3), 303-323.
- Nahm, A.Y., Vonderembse, M.A., and Koufteros, X.A. (2003). The impact of Organizational structure on time-based manufacturing and plant performance. *Journal of Operations Management*, Vol. 21 No. 3, 281-306.
- Nordin, N., Deros, B. M., & Wahab, D. A (2010). A survey on lean manufacturing implementation in Malaysian automotive industry. *International Journal of Innovation, Management and Technology*, 374-380.
- Naylor, J.B., Naim, M.M. and Berry, D. (1999). Legality: integrating the lean and agile manufacturing paradigms in the total supply chain. *International Journal of Production Economics*, Vol. 62 No. 1, 107-118.
- Narasimhan, R., Swink, M. and Kim, S.W. (2006). Disentangling leanness and agility: an empirical investigation. *Journal of Operations Management*, Vol. 24 No. 1, 440-457.
- Oliver Nick, Rick Delbridge, James Lowe (1996). Lean Production Practices. *International Comparisons in the Auto Components Industry*. S29–S44.
- Ohno, T. (1988). The Toyota Production System; Beyond Large-Scale Production. *Productivity Press, Portland, OR*.
- Olsen, O. E. (2004). Lean Manufacturing Management: the relationship between practice and firm level financial performance. *PhD dissertation*, 1-83
- Ohno, T. (1988). Toyota Production System. Cambridge. MA: *Productivity Press*.
- Power D, Sohal AS (2000). Human resource management strategies and practices in just-in-time environments: Australian case study evidence. *Technovation* 20(7):373-387.
- Pettersen, J. (2009). Defining Lean Production: Some Conceptual and Practical Issues. *The TQM Journal*, 21(2), 127-142.

- Rao, P., D. Holt. (2005). Do green supply chains lead to competitiveness and economic performance?. *International Journal of Operations & Production Management* 25(9):898-916.
- Rouhollah Mojtahedzadeh, V. C. Arumugam, A. Fallah, A. A. H. Mehrizi., (2012). The Relationship between Lean Manufacturing Management and Financial Performance. *6th International Quality Conference*, 343-348.
- R. Ashley Rawlins TD. DL (2008). Total Quality Management (TQM). *Author House*, 3, 1-5.
- Rappaport, A. (1987). Stock market signals to managers. *Harvard Business Review* 65(6): 63-76.
- Rothstein, J.S. (2004). Creating lean industrial relations: general motors in Silao, Mexico. *Competition and Change*, Vol. 8 No. 3, 203-221.
- Sekaran, Uma. (2003). Research Method for Business: A Skill-building Approach. NY: *John Wiley and Sons. New York*.
- Sundar R, Balaji AN, Satheesh Kumar RM (2014). A review on lean manufacturing Implementation techniques. *Procedia Eng* 97:1875-1885.
- Singh S. Garg D (2001). JIT system: concepts, benefits and motivations in Indian industries. *Int J Manage Bus Stud* 1(1):26-30.
- Sim, K.L. & Rogers, J.W. (2009). Implementing Lean Production Systems Barriers to Change. *Management Research News*, 32(1), 37-49.
- Shah, R., and Ward, P.T. (2007). Defining and developing measures of lean Production. *Journal of Operations Management* Vol. 25 No. 4, 785-805.
- Singh S. Garg D (2001). JIT system: concepts, benefits and motivations in Indian industries. *Int J Manage Bus Stud* 1(1):26-30
- Steven Frederic Rasch. (1998). Lean manufacturing practices: Do they work in American companies?. *University of Michigan*.
- Shah, R., & Ward, P. (2003). Lean manufacturing: Context, practice bundles, and performance. *Journal of Operations Management*, 21, 129-149.
- Singh, R. (1998). Lean manufacturing: changing paradigms in product manufacturing, design & supply. *The Third International Conference on Quality Management*, retrieved 23 December 2016 from [http:// www.qmconf.com/Docs/singh98.pdf](http://www.qmconf.com/Docs/singh98.pdf).

- Storch, R.L. and Lim, S. (1999). Improving flow to achieve lean manufacturing in shipbuilding. *Production Planning & Control*, Vol. 10 No. 2, 127-137.
- Schonberger, R. J. (2007). Japanese production management: An evolution - with mixed success. *Journal of Operations Management*, 25, 403-419.
- Simpson, D.F. and Power, D.J. (2005). Use the supply relationship to develop lean and green suppliers-Supply Chain Management. *International Journal*, Vol. 10 No. 1, 60-68.
- Seth, D. and Gupta, V. (2005). Application of value stream mapping for lean operations and cycle time reduction: an Indian case study. *Production Planning & Control*, Vol. 16 No. 1, 44-59.
- Tom Bonine. (2014). *Facing Down the Biggest Challenges in Manufacturing Today*. Retrieved 23 December 2016 from <http://www.manufacturing.net/article/2014/03/facing-down-biggest-challenges-manufacturing-today>.
- Taj, S. and Morosan, C. (2011). The impact of lean operations on the Chinese manufacturing performance. *Journal of Manufacturing Technology Management*, Vol. 22 No. 2, 223-240.
- Tu, Q., Vonderembse, M.A., Ragu-Nathan, T.S., Sharkey, T.W., (2006). Absorptive capacity: enhancing the assimilation of time-based manufacturing practices. *Journal of Operations Management* 24 (5), 692-710.
- Taj, S. and Berro, L. (2006). Application of constrained management and lean manufacturing in developing best practice for productivity improvement in an auto-assembly plant. *International Journal of Productivity and Performance Management*, Vol. 55 No. 4, 332-345.
- Todd, P. (2000). Lean Manufacturing: Building the Lean Machine. *Journal of Advanced Manufacturing*.
- Wayhan, V. B., and Balderson, E. L. (2007). TQM and financial performance: What has empirical research discovered?. *Total Quality Management & Business Excellence*, Vol. 18 No. 4, 403-12.
- Weber, E. J. (2008). A short history of derivative security markets. *Crawley, W.A: University of Western Australia, Business School, Economics Program*.
- Worley, J. (2004). The role of socio-cultural factors in a lean manufacturing implementation. Master thesis, *Oregon State University, Corvallis, OH*.
- White RE. Prybutok V (2001). The relationship between JIT practices and type Of Production system .*Omega* 29(2):113-124.

- Ward, P., Zhou, H., (2006). Impact of information technology integration and lean/just-in-time practices on lead-time performance. *Decision Sciences* 37 (2), 177-203
- Wood J. L. (2012). Disadvantages of Lean Manufacturing. Retrieved 20 December 2016 from http://www.ehow.com/list_6025715_disadvantages-lean_manufacturing.html#ixzz1nf9nyHmv.
- Womack, J.P., Jones, D.T., and Roos, D. (1990). The Machine that Changed the World New York: Rawson Associates. *Free Press*, 352.
- Womack, J.P. and D.T. Jones, (1996). Lean Thinking: Banish Waste and Create Wealth in Your Corporation. *Simon & Schuster, New York*.
- York, K.M., and Miree, C.E. (2004). Causation or covariation: an empirical re-examination of the link between TQM and financial performance. *Journal of Operations Management*, Vol. 22 No. 3, 291-311.
- Yang, M.G., Hong, P., and Modi, S.B. (2011). Impact of lean manufacturing and environmental management on business performance: An empirical study of manufacturing firms. *International Journal of Production Economics*, Volume 129, Issue 2, 251-261.
- Yasin MM, Small MH, Wafa MA (2003). Organizational modifications to support JIT implementation in manufacturing and service operations. *Omega* 31(3):213-226.