EXAMINING LEAN PRACTICES ON WAREHOUSE PERFORMANCE: A STUDY ON ELECTRICAL AND ELECTRONICS MANUFACTURING INDUSTRY

ADRIAN FOONG HONG NIAN

DOCTOR OF BUSINESS ADMINISTRATION
UNIVERSITI UTARA MALAYSIA
September 2020

EXAMINING LEAN PRACTICES ON WAREHOUSE PERFORMANCE: A STUDY ON ELECTRICAL AND ELECTRONICS MANUFACTURING INDUSTRY

By

ADRIAN FOONG HONG NIAN

Thesis Submitted to the
Othman Yeop Abdullah Graduate School of Business
Universiti Utara Malaysia,
in Partial Fulfillment of the Requirement for the Doctor of Business Administration

OTHMAN YEOP ABDULLAH GRADUATE SCHOOL OF BUSINESS
UNIVERSITI UTARA MALAYSIA

PERAKUAN KERJA TESIS / DISERTASI
(Certification of thesis / dissertation)

Kami, yang bertandatangan, memperakukan bahawa **ADRIAN FOONG HONG NIAN**
(We, the undersigned, certify that)

calon untuk Ijazah **DOCTOR OF BUSINESS ADMINISTRATION**
(candidate for the degree of)

telah mengemukakan tesis / disertasi yang bertajuk:
(has presented his/her thesis / dissertation of the following title):

**EXAMINING LEAN PRACTICES ON WAREHOUSE PERFORMANCE:
A STUDY ON ELECTRICAL AND ELECTRONICS MANUFACTURING INDUSTRY**

seperti yang tercatat di muka surat tajuk dan kulit tesis / disertasi.
(as it appears on the title page and front cover of the thesis / dissertation).

Bahawa tesis/disertasi tersebut boleh diterima dari segi bentuk serta kandungan dan meliputi bidang ilmu dengan memuaskan, sebagaimana yang ditunjukkan oleh calon dalam ujian lisan yang diadakan pada:
19 Februari 2020.
(That the said thesis/dissertation is acceptable in form and content and displays a satisfactory knowledge of the field of study as demonstrated by the candidate through an oral examination held on:
19 February 2020.

Pengerusi Viva *(Chairman for Viva)*	: **Prof. Dr. Wan Nordin Wan Hussin**	Tandatangan *(Signature)*	
Pemeriksa Luar *(External Examiner)*	: **Assoc. Prof. Dr. Tan Cheng Ling**	Tandatangan *(Signature)*	
Pemeriksa *Dalam (Internal Examiner)*	: **Dr. Herman Shah bin Anuar**	Tandatangan *(Signature)*	

Tarikh: **19 Februari 2020**
(Date)

Nama Pelajar (Name of Student)	:	**Adrian Foong Hong Nian**
Tajuk Tesis / Disertasi *(Title of the Thesis / Dissertation)*	:	**Examining Lean Practices on Warehouse Performance: A Study on Electrical and Electronics Manufacturing Industry**
Program Pengajian *(Programme of Study)*	:	**Doctor of Business Administration**
Nama Penyelia/Penyelia-penyelia *(Name of Supervisor/Supervisors)*	:	**Dr. Gunalan Nadarajah**

Tandatangan
(Signature)

PERMISSION TO USE

In presenting this dissertation/project paper in partial 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 dissertation/project paper in any manner, in whole or in part, for scholarly purposes may be granted by my supervisor(s) or in their absence, by the Dean of Othman Yeop Abdullah Graduate School of Business where I did my dissertation/project paper. It is understood that any copying or publication or use of this dissertation/project paper 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 dissertation/project paper.

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 Othman Yeop Abdullah Graduate School of Business
Universiti Utara Malaysia
06010 UUM Sintok
Kedah Darul Aman

ABSTRACT

Literature has recognized lean production and lean warehouse as prominent manufacturing philosophies that are based on customer-focused process improvements. To further enhance customer satisfaction, many Electrical & Electronics (E&E) manufacturers are turning to lean manufacturing practices to increase their business performance. However, numerous studies argued that the theory and practice show inconsistent results between lean practices and warehouse performance. In the Malaysian context, few researches have been conducted on lean warehouse practices in E&E manufacturing, notably in Penang; where concentration on manufacturing warehouse is high. Therefore, this study sought to establish the inter-relationship of lean warehouse practices of standardization, supplier network, quality at source and inventory management and MNC's customer satisfaction, underpinned by the Resource-Based View (RBV). A quantitative and the cross-sectional research design were adopted, and one hundred and fifty-two research questionnaires were administered to managers/executives in Penang. A valid response of one hundred and twenty-seven questionnaires was obtained and the data was analyzed using the SPSS and Smart PLS. From the research outcome, the hypothesized relationship between lean practices of standardization and warehouse's customer satisfaction was supported. Secondly, the hypothesized relationship between lean practices of supplier network and warehouse's customer satisfaction was supported. Thirdly, the hypothesized relationship between lean practices of quality at source and warehouse's customer satisfaction was also supported. Finally, however, the hypothesized relationship between lean practices of inventory management and warehouse's customer satisfaction was not supported. Theoretical and applied implications, as well as recommendations and future research are discussed in this study.

Keywords: *Lean practices, warehouse performance, customer satisfaction, electrical & electronics manufacturing, Penang*

ABSTRAK

Kajian-kajian lepas telah mengiktiraf pengeluaran lean dan gudang lean sebagai falsafah pembuatan penting yang bersandarkan penambahbaikan prestasi dan proses berfokus pelanggan. Untuk memenuhi keperluan dan persaingan pasaran yang kompetitif serta memenuhi kehendak pelanggan, pengeluar sektor elektrik dan elektronik (E&E) kini beralih kepada amalan operasi yang berasaskan konsep lean untuk mengurangkan kitaran masa dan meningkatkan prestasi perniagaan. Walau bagaimanapun, terdapat banyak teori dan amalan yang menunjukkan dapatan yang tidak konsisten di antara amalan lean dan prestasi gudang. Dalam konteks Malaysia, beberapa kajian telah dijalankan ke atas amalan gudang yang mengamalkan konsep lean dalam sektor pembuatan E&E khususnya di Pulau Pinang yang tumpuan terhadap gudang pembuatan adalah tinggi. Kajian ini bertujuan untuk menganalisis hubungan piawaian amalan lean sumber pembekal, amalan lean kualiti pada sumber dan pengurusan inventori dalam gudang untuk memenuhi kehendak pelanggan antarabangsa dengan berteraskan teori Pandangan Berasaskan Sumber (RBV). Pendekatan kuantitatif dan reka bentuk kajian keratan rentas digunakan dan sebanyak 152 borang soal selidik diedarkan kepada pengurus atau eksekutif di Pulau Pinang. Sebanyak 127 maklum balas sah diterima dan data dianalisis menggunakan SPSS dan model Smart PLS. Dapatan kajian menyokong hipotesis hubungan langsung antara piawaian amalan lean dan kepuasan pelanggan gudang. Hasil kajian turut menyokong hipotesis kedua iaitu hubungan langsung antara amalan lean rangkaian pembekal dan kepuasan pelanggan gudang. Hubungan langsung antara amalan lean kualiti pada sumber dan kepuasan pelanggan gudang pula menyokong hipotesis ketiga. Walau bagaimanapun, dapatan kajian tidak menyokong hipotesis keempat iaitu hubungan antara amalan lean pengurusan inventori dan kepuasan pelanggan gudang. Implikasi teori dan praktik serta cadangan penyelidikan lanjut juga dibincangkan dalam kajian ini.

Kata kunci: *Amalan lean, prestasi gudang, kepuasan pelanggan, sektor pembuatan elektrik & elektronik, Pulau Pinang*

ACKNOWLEDGEMENT

I thank God, the almighty for his infinite mercy and endless blessings upon us all. Also, I have to thank everyone that contributed in making this academic program to become a success. In specific, I have to express my sincere gratitude and appreciation to my supervisors, Dr. Gunalan Nadarajah for his unalloyed supports and encouragements throughout the period of the study. Equally, I have to thank Prof. Dr. Wan Nordin Wan Hussin, Dr. Herman Shah Anuar and Prof. Madya Dr. Tan Cheng Ling for critically examining the thesis and making objective comments that unequivocally contributed to the enrichment of the thesis work. Again, I have to thank the staff and management of Universiti Utara Malaysia (UUM), for being always readily available to discuss and solve problems of students. Once more, I have to thank both the staff and management of UUM, particularly for creating a conducive environment for teaching and learning, and as well, providing an effective and efficient electronic platform for students to access enormous amount of literature (research articles and scholarly books) pertaining to their respective field of studies.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

LIST OF ABBREVIATIONS

Abbreviation		Page
E&E	Electrical and Electronics	5
MRO	Maintenance Repair and Overhaul	5
SMEs	Small and Medium Enterprises	7
Kaizen	Japan word: continuous improvement	7
ATP	Available To Promise	9
MIDA	Malaysia Investment Development Authority	9
MNC	Multinational Corporations	12
SOP	Standard Operating Procedures	19
QATS	Quality At Source	20
NEC	National Export Council	21
MATRADE	Malaysia External Trade Development Corporation	21
GDP	Gross Domestic Product	22
MITI	Ministry of International Trade and Industry	22
ICT	Information and Communication Technology	22
UNIDO	United Nations Industrial Development Organization	23
R&D	Research and Development	24
LED	Light Emitting Diode	24
PCB	Printed Circuit Board	24
EMS	Electronic Manufacturing Services	25
RF	Radio Frequency	25
LMW	Licensed Manufacturing Warehouse	26
WIP	Work In Progress	32
KPI	Key Performance Indicator	35
ASN	Advanced Shipping Notice	36
EDI	Electronic Data Interchange	36
AS/RS	Automated Storage and Retrieval System	38
VOC	Voice Of Customer	52
MURI	Japan word: overloading, exertion	60
MURA	Japan word: imbalances, Deviations	60
MUDA	Japan word: Losses and wastage	60
5S	Work Place Organization	61
OPL	One Point Lesson	61
SKU	Stock Keeping Unit	72
JIT	Just In Time	73
EOQ	Economic Order Quantities	84
VMI	Vendor Managed Inventory	84
LM	Lean Manufacturing	98
CR	Composite Reliability	120
CA	Cronbach's Alpha	120
AVE	Average Variance Extracted	126
FMM	Federation of Malaysian Manufacturers	128

CHAPTER ONE

INTRODUCTION

This chapter presents the background of the study which explains the lean concept, lean manufacturing; and notably lean practices are highly impactful in the warehouse management and the configuration of supply chain network in the electrical and electronics manufacturing. The second part is the problem statement which delineates the operational warehouse issues, focusing on warehouse customer satisfaction and the pivotal role played by warehouse's lean practices in the network of manufacturing value chain. The contextualization of electrical and electronics industry in Malaysia is firmly grounded in this dissertation; with Penang as the focal point of the study. The second last section describes the research questions, the research objectives, and the scope of the study. Finally, the remaining part explains the significance of the study and the organization of this dissertation

1.0 Background of Study

"Lean", is a manufacturing practice pioneered by Toyota in circa 1950 (Ohno, 1988) to remove waste. The principal suppositions are all about waste expulsion, and ultimately lead to the internal and external customer satisfaction and business bottom-line performance (Richardson, 2018; Andrés-Lópeza, González-Requenaa & Sanz-Loberaa, 2015). Second supposition is daily continuous improvements (thus, continual waste expulsion) are more efficient and sustainable than one-off system wide retooling (Ramunė & Milita, 2013; Gupta & Jain, 2013, Womack, Jones & Roos 1991; Ohno, 1988).

REFERENCES

Achanga, P., Shehab, E., Roy, G., & Nelder,G. (2006). Critical Success Factors for Lean Implementation within SMEs. *Journal of Manufacturing Technology Management, 17*(4), 460-471.

Ackerman, K. B. (2012). *Practical handbook of warehousing,* Springer Science & Business Media.

Ackerman K.B. (1997). *Customer Satisfaction - The Role of the Warehouse. In: Practical Handbook of Warehousing.* Springer, Boston, MA.

Akel, Tommelein & Boyers (2004). *Application of Lean Supply Chain Concepts to a Vertically-Integrated Company: A Case Study.* Annual Conference of the International Group for Lean Construction – IGLC 12 Copenhagen.

Aleksandra A., Marija, R., & Danijela S. P., (2016). Effects of Lean Tools in Achieving Lean Warehousing. *Economic Themes, 54*(4), 517-534.

ALFRA Lean Advisor (2018). *Quality at the Source.* Available: http://alfraleanadvisors.com/quality-at-the-source/ (Accessed: 28th February 2018).

Alicke, K., Leopoldseder, M., Mishra, D., & Wolf‐ Axel Schulze (2008). What's in your Warehouse? McKinsey & Company.

Alicke, K. & Lösch, M. (2010). Lean and mean: How does your supply chain shape up?vMcKinsey & Company.

Alsmadi, M., Almani, A. & Jerisat, R. (2012). A comparative analysis of Lean practices and performance in the UK manufacturing and service sector

firms. *Total Quality Management & Business Excellence, 23*, 3–4, 381–396.

Anand, G. & Kodali, R., (2010). Development of a framework for implementation of lean manufacturing systems. *International Journal of Management Practice, 4*(1), 95–116.

Anand, G. & Kodali, R. (2008). Benchmarking the benchmarking models, Benchmarking: An International Journal, Vol. 15 Issue: 3, pp. 257-291.

Anđelković, Radosavljević, Stošić Panić (2017). Effects of Lean Tools in Achieving LeanvWarehousing. *Economic Themes, 54*(4): 517-534.

Andrés-Lópeza, E, González-Requenaa, I, & Sanz-Loberaa, A. (2015). Lean Service: Reassessment of Lean Manufacturing for Service Activities. *Procedia Engineering, 132*, 23 – 30.

Angelis, J., Conti, R., Cooper, C., & Gill, C. (2011). Building a high-commitment lean culture. *Journal of Manufacturing Technology Management,* 22(5), 569-586.

Anvari, A., Zulkifli, N. & Yusuff, R.M. (2012). A dynamic modelling to measure lean performance within lean attributes. The International Journal of Advanced Manufacturing Technology, pp. 1–15.

Argusi (2016), *European Warehousing Labor Cost.* Available: http://www.argusi.org/en/europeanwarehousing.

Armstrong, J.S., & Overton, T.S. (1977). Estimating nonresponse bias in Mail surveys. *Journal of Marketing Research, 14, 396-4'02.*

Arumugam, V., Antony, J. & Douglas, A. (2012). Observation: a lean tool for improving the effectiveness of Lean Six Sigma. *The TQM Journal, 24*(3), 275–287.

Assarlind, M., Gremyr, I. & Bäckman, K. (2012). Multi-faceted views on a Lean Six Sigma application. *International Journal of Quality & Reliability Management, 29* (1), 21–30.

Astrachan, C. B., Patel, V. K., & Wanzenried, G. (2014). A comparative study of CB-SEM and PLS-SEM for theory development in family firm research. *Journal of Family Business Strategy*, *5*(1), 116-128.

Atieh, A. M., Kaylani, H, Al-abdallat, Y, Qaderi, A., Ghoul, L., Jaradat, L., Hdairis, I (2016). Performance Improvement of Inventory Management System Processes by an Automated Warehouse Management System. *Procedia CIRP,* 41, 568-572.

Ayeni, P., Ball, P. and Baines, T. (2016). Towards the strategic adoption of Lean in aviation Maintenance Repair and Overhaul (MRO) industry: An empirical study into the industry's Lean status. *Journal of Manufacturing Technology Management, 27* (1), pp. 38 – 61.

Badurdeen, F., & Gregory, B (2012). The Softer of Lean. *Industrial Engineer*, 49-53.

Bag, S (2018). Supplier Management and Sustainable Innovation in Supply Networks: An Empirical Study. *Global Business Review, 19(*3), S176-S195. https://doi.org/10.1177/0972150918760051

Bagozzi, R. P., & Yi, Y. (2012). Specification, evaluation, and interpretation of structural equation models. *Journal of the academy of marketing science*, *40*(1), 8-34.

Bagozzi, R. P., & Yi, Y. (1991). Multitrait-multimethod matrices in consumer research. *Journal of Consumer Research*, *17*(4), 426-439.

Baker, P. & Canessa, M. (2009). Warehouse design: a structured approach. European *Journal of Operational Research. 193*, 425-436.

Balgobin, R. N. S. (2003). An alternative based view of high velocity corporate turnaround. In *ESC Business School Conference* (pp. 1–25). Lille. Retrieved from https://sta.uwi.edu/conferences/financeconference/Conference Turnaround.pdf

Barney, J.H. (1991). Firm Resources and Sustained Competitive Advantage. *Journal of Management, 17* (1), 99-120. https://doi.org/10.1177/014920639101700108

Bartholomew, D. (2008). *Putting Lean Principles in the Warehouse.* Lean Enterprises Institute. Retrieved from: http://www.lean.org/common.

Barton, H. (2013). Lean' policing? New approaches to business process improvement across the UK police service. *Public Money & Management, 33*(3), 221–224.

Beamon. B.M. (1999). Measuring supply chain performance. *International Journal of Operations and Production Management, 19*(3), 275-292.

Ben Naylor, J., Naim, M. M. & Berry, D. (1999). Leagility: Integrating the lean and agile manufacturing paradigms in the total supply chain. *International Journal of Production Economics, 62*, 107-118.

Berg, N. (2002). *Non-response bias.* University of Texas at Dallas.

Berling, P. (2011). *A Characterization of optimal Base-Stock levels for a Continuous Stage Serial Supply Chain.* IESE Business School. University of Navara.

Bertrand, J.W.M, Poutre, J.A.L. & Luin, J.V. (2006). *Learning Inventory Management Strategies for Commodity supply chains with Customer satisfaction.*

Bhat, R.R. (2013). Investigation of lean tools to enhance productivity in manufacturing sector. *Int J Adv Eng Sci 3*:116–120.

Bhausaheb, A. N. & Routroy, S. (2010). Evaluation of Inventory Performance for Perishable Products through Simulation. *Journal of Operations Management (9),* 71-72.

Bicheno, J. (2008). Lean Toolbox for service Systems. England: lean Enterprise Research Centre, Cardiff Business School and University of Buckingham.

Bienstock. C.C., Royne. M.B., Sherrel. D., & Stafford. T.F. (2008). An expanded model of logistics service quality: Incorporating logistics information technology. *International Journal of Production Economics, 113* (1), 205-222.

Biton, N. & Howell, G. (2013). *The Journey of Lean Construction Theory: Review and Reinterpretation*. Proceedings, IGLC, Fortaleza,Brazil, pp. 125–132.

Bookbinder, J. H., Gümüş, M., & Jewkes, E. M. (2010). Calculating the benefits of vendor inventory in a manufacturer-retailer system. *International Journal of Production Research*, *48*(19), 5549-5571.

Borade, A., & Bansod, S. (2012). Interpretive structural modeling-based framework for VMI Indian industries. *International Journal of Advanced Manufacturing Technology*, *58*(9-12), 1227-1242.

Bortolotti, T. & Romano, P. (2012). Lean first, then automate: a framework for process improvement in pure service companies. A case study. *Production Planning & Control, 23*(7), 513–522.

Bowersox, D.J., Closs, D. J. & Cooper, M. B. (2002). *Supply chain logistics management,* McGraw-Hill New York, NY.

Bozer, Y. A. (2012a). Final Report 2012- Developing and Adapting Lean Tools/ Techniques to Build New Curriculum/Training Program in Warehousing and Logistics. Available: http://www.mhi.org/downloads/learning/cicmhe/funding/leanwarehousing.pdf (Accessed: 28th February 2018).

Bozer, Y. A. (2012b). *Warehousing in the global supply chain: Preface.* London: Springe-Verlag.

Brannick, M. T., Chan, D., Conway, J. M., Lance, C. E., & Spector, P. E. (2010). What is method variance and how can we cope with it? A panel discussion. *Organizational Research Methods*, *000*, 1–14. doi:10.1177/1094428109360993

Brewer, P.C & Speh, T.W. (2000). Using the Balanced scorecard to Measure Supply Chain Performance. *Journal of Business Logistics (12),* 78-80.

Brwoning, D. (2017). *Lean Warehousing: 8 Wastes of the Warehouse.* Retrieved from https://leancor.com/lean-warehousing-8-wastes-of-the-warehouse.

Bryman, A. (2012). *Social research methods (4th ed.).* New York: Oxford University Press.

Bryman, A. (2008). *Social Research Methods.* New York.

Buchner, A., Erdfelder, E., & Faul, F. (1997) *How to use GPower*. Heinrich-Heine-Universität: Düsseldorf. See: www.psycho.uni-duesseldorf.de/aap/projects/gpower/how_to_use_gpower.html (accessed 17 December 2017).

Cachon, G. & Terwiesch. (2006). *Matching supply with Demand - An Introduction to Operations Management.* McGraw-Hill. New York.

Camacho, M. V. (2011). *Warehouse Logistics and Internal Distribution Optimization.*
Instituto Superior Tecnico. Universidade Tecnica de Lisboa.

Carnovale, S, Yeniyurt, S, & Rogers, D.S. (2017). Network connectedness in vertical and horizontal manufacturing joint venture formations: A power perspective. *Journal of Purchasing and Supply Management, 23*(2), 67-81.

Chadha, R., Singh, A. & Kalra, J. (2012). Lean and queuing integration for the transformation of health care processes: A lean health care model. *Clinical Governance: An International Journal, 17*(3), 191–199.

Chakravorty, S.S. (2009). Improving distribution operations: Implementation of material handling systems. *International Journal of Production Economics, 122* (1), 89-106.

Chandler, A. D. (1990). *Strategy and structure: Chapters in the history of the American industrial enterprise*. Massachusetts: MIT Press.

Cenfetelli, R. T., & Bassellier, G. (2009). Interpretation of formative measurement in information systems research. *MIS Quarterly*, 689-707.

Çetinkaya, S., & Lee, C. Y. (2000). Stock Replenishment and Shipment Scheduling for Vendor-Managed Inventory Systems. *Management Science*, *46*(2), 217-232.

Cermak. D.S., File. K.M., & Prince. R.A. (2011). Customer participation in service specification and delivery. *Journal of Applied Business Research, 10*(2), 90-97.

Chena, J. C., Lib, Y., & Shadyc, B. D. (2010). From value stream mapping toward a lean/sigma continuous improvement process: an industrial case study. *International Journal of Production Research, 48*(4).

Chiarini, A. (2011). Integrating lean thinking into ISO 9001: a first guideline. *Int J Lean Six Sigma 2*:96–117.

Chiarini, A. & Douglas, A (2015). The impact of logistics solutions on customer satisfaction: an exploratory qualitative study of manufacturing companies. *Sinergie Italian Journal of Management, 33*, (97).

Chin, W. W. (1998). The partial least squares approach for structural equation modeling. In George A. Marcoulides (Ed.), Modern Methods for Business Research, Lawrence Erlbaum Associates, Lawrence Erlbaum Associates, Mahwah, NJ, 295-336.

Choi. T.Y., & Eboch. K. (1998). The TQM paradox: relations among TQM practices, plant performance, and customer satisfaction. *Journal of Operations Management, 17*(1), 59-75.

Christopher, M, (2011). *Logistics and supply chain management: Strategies for reducing cost and improving service, (2nd ed).* Indiaorling Kindersley.

Churchill, G.A.J. (1979). A Paradigm for Developing Better Measures of Marketing Constructs. *Journal of Marketing Research, 16* (1):64–73.

Cohen, J. (1 988). *Statistical Powel Analysis for the Behavioral sciences,* (2nd Ed.). New Jersey: Lawrence Erlbaum Associates.

Conway, J. M., & Lance, C. E. (2010). What reviewers should expect from authors regarding common method bias in organizational research. *Journal of Business and Psychology*, *25*(3), 325–334. doi:10.1007/s10869-010-9181-6.

Cooper, D. R., Schindler, P. S., & Sun, J. (2006). *Business research methods* (Vol. 9). New York: McGraw-Hill Irwin.

Costantino, N., Dotoli, M., Falagario, M., Fanti, M. P., & Mangini, A. M. (2012). A model for supply management of agile manufacturing supply chains. *International Journal of Production Economics,* 135(1), 451-457.

Creswell, J. W. (2012). *Educational Research: Planning, Conducting, and Evaluating Quantitative and Qualitative Research.* Boston: Edwards Brothers.

Cronin, J. & Taylor, S.A. (1992). Measuring service quality: A Reexamination and extension. *Journal of Marketing, 56,* 55-68.

Cunningham, J. B. & McCrum-Gardner, E. (2007). Power, effect and sample size using GPower: practical issues for researchers and members of research ethics committees. *Evidence Based Midwifery* 5(4): 132-6.

Dan Cunha, C., Agard, B. & Kusiak, A. (2007). Design for Cost: Module-Based mass Customization. *IEEE Transaction on Automation and Engineering, 4*(3), 169-174.

Daft, R. L. (2009). *Organization theory and design* (10th ed.). Mason, OH: South-Western Cengage Learning Pub.

Defonseka, C. (2015). Is Lean Manufacturing the Answer to Surviving during Difficult Economic Times? *Canadian Institute of Management*, 23-24.

Dehdari, P. (2013). Measuring the Impact of Lean Techniques on Performance Indicators in Logistics Operations. Doctoral dissertation. Faculty of Mechanical Engineering. Institute of Technology. Karlsruhe. Germany.

Del Baldo. M. (2011). Logistica: punto di incontro o di scontro tra old e new economy?", *Sinergie, (57),* 87-105.

Demeter, K. & Matyusz, Z. (2011). The Impact of Lean Practices on Inventory Turnover. *International Journal of Production Economics, 133*(1), 154-163.

Dillman, D. A. (1978). *Mail and telephone Survey: Total design method* New York: John Willey & Sons, Inc.

Di Pietro, L., Mugion, R.G. & Renzi, M.F. (2013). An integrated approach between Lean and customer feedback tools: An empirical study in the public sector. *Total Quality Management & Business Excellence, 24* (7–8), 899–917.

Disney, S. M., & Towill, D. R. (2003). The effect of vendor managed inventory (VMI) dynamics on the Bullwhip Effect in supply chains. *International Journal of Production Economics*, *85*, 199-215.

Eckert, S.G. (2007). Inventory Management and Its Effects on Customer Satisfaction. *Journal of Business and Public Policy, (1),* 1-2.

Eroglu, C. & Hofer, C. (2011). "Lean, leaner, too lean? The inventory - performance link revisited. *Journal of Operations Management, 29* (4), 356–369.

Ewuola, S.O., Imoundo, P.B, Ajibefun, I., daramola, A.G. & Ayodeji, O. (2005). *Inventory Management in an Agro-Allied Industry: A Case study of Cocoa processing Plants In South western Nigeria.*

Fawcett, S. E., Waller, M. A., Miller, J. W., Schwieterman, M. A., Hazen, B. T., & Overstreet, R. E. (2014). A trail guide to publishing success: tips on writing influential conceptual, qualitative, and survey research. *Journal of Business Logistics*, *35*(1), 1-16.

Ferlie E. (2014). Resource based view: a promising new theory for healthcare organizations: Comment on "Resource based view of the firm as a theoretical lens on the organizational consequences of quality improvement". Int J Health Policy Management 2014; 3: 347–348. doi: 10.15171/ijhpm.2014.107

Federation of Malaysia Manufacturers (FMM) (2016). FMM Directory of Malaysian Industries 2016, 47th Edition. Retrieved from http://www.fmm.org.my/Penang.aspx.

Felix Chan T.S. & Chan, H.K. (2011). Improving the productivity of order picking of a manual-pick and multi-level rack distribution warehouse through the implementation of class-based storage. *Expert Systems with Applications, 38*(3), 2686-2700.

Flint. D.J., Blocker C.P., & Boutin JR P.J. (2011). Customer value anticipation, customer satisfaction and loyalty: An empirical examination. *Industrial Marketing Management, 4*(2), 219-230.

Four Principles Management Consulting (2017). *Lean Warehouse Operations.* Available:

https://fourprinciples.com/wpcontent/uploads/2017/07/FP_lean_warehouse_operatios pdf. (Accessed on 27th, February 2018).

Fornell, C. & Larcker, D. F. (1981). Evaluating Structural Equation Models with Unobservable Variables and Measurement Error. *Journal of Marketing Research, 18.*

Frazalle, E. & Frazalle, E. (2002). *World-class warehousing and material handling,* McGrawHill, New York.

Fu, N., Flood, P. C., Bosak, J., Morris, T., & O'Regan, P. (2013). Exploring the performance effect of HPWS on professional service supply chain management. *Supply Chain Management*, *18*(3), 292-307.

Fumi, A. Scarabotti, L. & Schiraldi, M. M. (2013). The Effect of Slot-Code Optimization in Warehouse Order Picking. *International Journal of Engineering Business Management, 5*(20), 1-10.

Gander, M.J. & Snyder, K. (2011). The Journey toward Lean Manufacturing: Applying the Kaizen Blitz Method to Improving Operations. *International Business & Economics Research Journal (IBER), 1*(11).

Gergova, I. (2010). Warehouse improvement with Lean 5S-A case study of Ulstein Verft AS. *Journal of Business Strategy, 29*(1), 40-45.

Genchev S.E., Richey. R.G., & Gabler. C.B. (2011). Evaluating reverse logistics programs: suggested process formalization. *The International Journal of Logistics Management, 22*(2), 242-263.

Gîfu, D., Ionescu, D. & Teodorescu, M. (2014). Design of a Stable System by Lean Manufacturing. *International Letters of Social and Humanistic Sciences, 17*, 61–69.

Godfrey, P. C., & Hill, C. W. L. (1995). The problem of unobservables in strategic management research. *Strategic Management Journal*, *16*(7), 519–533.

Goel, P., & Kleiner, B (2015). Achieving Excellence in Lean Manufacturing, *Franklin Business & Law Journal, Issue 1*, 1-10.

Goldsby, T. & Martichenko, R. (2005) *Lean Six Sigma Logistics Strategic Development to Operational Success*. J. Ross Publishing, Inc

Graham, D. (2014). *Think You Know Your Warehouse or Distribution Center?* Think Again. Lean Enterprise Institute, Retrieved from: http://www.lean.org.

Griffin. A., Gleason G., Preiss R., & Shevenaugh D. (1995). Best practice for customer satisfaction in manufacturing firms. *Sloan Management Review, 36* (2).

Greene, A. & O'Rourke, D. (2006). *Lean Manufacturing Practice in a cGMP environment.* Retrieved from Pharmaceutical Technology Europe: http://www.ptemagazine.com.

Gu, J., Goetschalckx., M., & McGinnis, L.F. (2010). Research on warehouse design and performance evaluation: A comprehensive review. *European Journal of Operational Research*, 203(3), 539-549.

Gudem, M., Steinert, M., Welo, T. & Leifer, L. (2013). Redefining customer value in lean product development design projects. *Journal of Engineering, Design and Technology, 11*(1), 71–89.

Gunasekaran. A., Patel. C., Tirtiroglue. (2001). Performance measures and metrics in a supply chain environment. *International journal of operations and production Management, 21(*1/2), 71-87.

Gunasekaran. A., Patel. C., & Mcgaughey R.E. (2004). A framework for supply chain performance measurement. *International journal of production economics, 87*(3), 333-347.

Gupta. S., & Jain, S.K. (2013). A literature review of lean manufacturing. *International Journal Management Science Engineering Management, 8*, 241–249.

Haan, de J. Overboom, M. & Naus. F. (2011). *Lean Logistics Service Providers: Option or Utopia? Experiences from the Netherlands.* Changing Paradigm for Inventory Management in a Supply Chain Context (ed. D. Kisperska-Moron), pp. 78-97.

Hackman, S. T., Frazalle, E. H., Griffin, P. M., Griffin, S. O. & Vlasta, D. A. (2001). Benchmarking warehousing and distribution operations: an input-output approach. *Journal of Productivity Analysis, 16*, 79-100.

Hair Jr, J. F., Money, A. H., Samouel, P., & Page, M. (2007). *Research Methods for Business.* West Susex, England: John Wiley and Sons Ltd.

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate Data Analysis: A Global Perspective* (Seventh Edition ed.). Upper Saddle River, New Jersey: Person Education Inc.

Hair, J. F., Sarstedt, M., Ringle, C. M., & Mena, J. A. (2012). An assessment of the use of partial least squares structural equation modeling in marketing research. *Journal of the academy of marketing science*, *40*(3), 414-433.

Hair, J., Celsi, M., Money, A., Samouel, P., & Page, M. (2011). Essentials of business research methods (2nd edition ed.): ME Sharpe Inc.

Hair, J. F., Hult, G. T. M., Ringle, C., & Sarstedt, M. (2014). A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM), Los Angeles: USA: SAGEPublications Inc.

Hariga, M., Gumus, M., Daghfous, A., & Goyal, S. K. (2013). A vendor managed inventory model under contractual storage agreement. *Computers & Operations Research*, 40, 2138-2144.

Harun, M.F., Habidin, N.F., & Md Latip N.A., (2017). The relationship between 5S lean tool and WP of FMCG Warehouse in Peninsular Malaysia, *International Journal of Academic Research in Business and Social Sciences, 7*(6). DOI: 10.6007/IJARBSS/v7-i6/3062

Harvey, R. J., Billings, R. S., & Nilan, K. J. (1985). Confirmatory Factor Analysis of the Job Diagnostic Survey. Journal of Applied Psychology, 70(3), 461-468.

Hayes, R.H. & Pisano, G.P. (1994). Beyond world class: the new manufacturing strategy, *Harvard Business Review,* January-February, 77-86.

Heizer, J. & Render, B. (2008). *Operations Management* (Ninth ed.). New Jersey: Pearson Prentice Hall.

Hines, P., Holweg, M., & Rich, N. (2004). Learning to evolve: a review of contemporary Lean thinking. *International Journal of Operations and Production Management, 10*(24).

Hines, P. & Taylor, D. (2000a). *Going lean*. Cardiff, UK: Lean Enterprise Research Centre Cardiff Business School, 3-43.

Hines, P. & Taylor, D. (2000b). Going lean. Cardiff, UK: Lean Enterprise Research Centre Cardiff Business School.

Hong, P., Yang, M.G.M. & Dobrzykowski, D.D. (2014). Strategic customer service orientation, lean manufacturing practices and performance outcomes. *Journal of Service Management,* Emerald Group Publishing.

Hongjie, L., Ruxian, L., Zhigao, L., & Ruijiang, W. (2011). Study on the inventory control of items under VMI model based on bi-level programming. *Expert Systems with Applications*, 38, 9287-9295.

Howell, G. (2001). *Introducing Lean Construction: Reforming Project Management.* Report Presented to the Construction User Round Table (CURT). – Lean Construction Institute.

IBM Global Business Outlook Report (2015). Retrieved from http://www.ibm.com.

Invest in Penang (2018). Retrieved from http:// www.investpenang.gov.my.

Ismyrlis, V. & Moschidis, O. (2013). Six Sigma's critical success factors and toolbox. *International Journal of Lean Six Sigma, 4* (2), 108–117.

Jacoby, D. (2010). *Guide to supply chain management,* London, Profile Books Ltd.

Jader, J. (2012). *Lead Time Reduction: Improving the Customer's Service Experience.*

Jaiganesh, V. & Sudhahar, J.C. (2013). Sketching Out the Hidden Lean Management Principles. *International Journal of Scientific and Research Publications, 3*(2).

Johnson, A. & McGinnis, Leon. (2011). Performance measurement in the warehousing industry, *IIE Transactions,* 43, 220–230. DOI: 10.1080/0740817X.2010.491497.

Jokela, P & Söderman, A (2017). Re-examining the link between fairness and commitment in buyer-supplier relationships. *Journal of Purchasing and Supply Management, 23* (4), 268-279.

Kähkönen, A.K, & Lintukangas, K (2017). The underlying potential of supply management in value creation. *Journal of Purchasing and Supply Management, 18* (2), 68-75.

Karlsson, C. & Åhlström, P. (1996). Assessing changes towards lean production. *International Journal of Operations & Production Management 16*, 24-41.

Kaufmann, L, Kreft,S, Ehrgott, M & Reimann, F. (2012). Rationality in supplier selection decisions: The effect of the buyer's national task environment. *Journal of Purchasing and Supply Management, 18* (2), 76-91.

Khan M.S., Naumann. E., & Willaims P. (2012). Identifying the key drivers of customer satisfaction and repurchase intentions: An empirical investigation of Japanese B2B services. *Journal of Consumer Satisfaction, Dissatisfaction and Complaining Behavior, 25*(3), 159-178.

Khurana H., & Sohal J.S. (2011). Implementation of New Management Agile Technique for Reducing Overtime and Increasing Customer Satisfaction Hossain. *International Journal of Engineering Science and Technology, 3*(1), 238-241.

Kłodawski, M, Jacyna, M, Lewczuk, K, Wasiak,M (2017). The Issues of Selection Warehouse Process Strategies. *Procedia Engineering 187*, 451 – 457.

Koenigsaecker,G. (2013). *Leading the Lean Enterprise Transformation, 2nd Edition.* CRC Press.

Knights, M. (2008). *Managing stock levels: Materials Management and Inventory Control*.

Kristianto. Y., Ajmal. M.M., Sandhu. M. (2012). Adopting TQM approach to achieve customer satisfaction: A flour milling company case study. *The TQM Journal, 24*(1), pp. 29-46.

Krosnick, J. A., & Fabrigar, L. R. (1997). Designing rating scales for effective measurement in surveys. *Survey measurement and process quality*, 141-164.

Kumar, M., Abdul Talib, S., & Ramayah, T. (2013). *Business research method.* New York: Oxford University Press.

Kumar, G.A., & Mehta, R.K. (2013). Lean manufacturing practices: Emerging issues. *International Journal of Innovation Research Development, 2,* 69–78.

Lai. K.H., & Cheng. T.E. (2009). *Just-in-time logistics*. Gower Publishing, Ltd, Burlington.

Lean Enterprise Institute (2003). Lean Lexicon. A graphical glossary for Lean Thinkers Lean Enterprise Institute, US ISBN 0-9667843-6-7.

Lee, H. & Kleiner, B. (2001). Inventory Management in Women's Retail Clothing Industry: *Management Research News. (24),* 40-45.

Liker, J. K & Meier, D (2005). *Toyota Way Field Book: A Practical Guide for Implementing Toyota's 4P's*, McGraw-Hill.

Liker. J.K. (2004). *The Toyota way: 14 Management Principals from the world's greatest manufacturer.* New York, NY: MCGraw-Hill.

Liker, J. K. & Wu, Y.-C. (2000). Japanese automakers, U.S. Suppliers and supply-chain superiority. *MIT Sloan Management Review*, 42(1), 81.

Lin, C., Chu-Hua, K., & Kang-Wei, C. (2013). Identifying critical enablers and pathways to high performance supply chain quality management. *International Journal of Operations & Production Management*, *33*(3), 347-370.

Lun. Y.V., Lai. K.H., Cheng. T.C.E., & Shang. K.C. (2015). Examining the influence of organizational capability in innovative business operations and the mediation of profitability on customer satisfaction. *International Journal of Production Economics*, Article in press.

MacKenzie, S. B., & Podsakoff, P. M. (2012). Common method bias in marketing: causes, mechanisms, and procedural remedies. *Journal of Retailing*, *88*(4), 556–562. doi:10.1016/j.jretai.2012.10.002

Mahfouz, A. (2011). *An Integrated Framework to Assess 'Leanness' Performance in Distribution Centres.* Ph.D. thesis, Dublin Institute of Technology, Dublin.

Maister, D. H. (1985). The psychology of waiting lines. In J. A. Czepiel, M. R. Solomon & C. F. Suprenant (Eds.), The service Encounter: Managing Employee/Customer Interaction in service Business.Lexington: Lexington Books. PMid:4037768.

Maleyeff, J. (2006). Exploration of Internal Service Systems Using Lean Principles. *Management Decision, 44*(5), 674-689.

Malhotra, N. K., Kim, S. S., & Patil, A. (2006). Common method variance in IS research: a comparison of alternative approaches and a reanalysis of

past research. *Management Science*, *52*(12), 1865–1883. doi:10.1287/mnsc.l060.0597.

Malaysia Investment Development Authority (MIDA) (2017). *Malaysia Investment Performance Report 2017.* Retrieved from www.mida.gov.my/home/electrical-and-electronic/posts.

Malaysia Productivity Corporation (MPC) (2016). *Malaysia Lean Road Map*. Retrieved from http://www.mpc.gov.my/leanmanagement.

Malaysia Productivity Corporation (MPC) (2015). *Reducing Unnecessary Regulatory Burdens (RURB): Electrical & Electronics (E&E).* Retrieved from http://www.mpc.gov.my/wp-content/uploads/2016/04/Issues-Paper-Malaysian-Electronics-Electrical.

MATRADE (2017). *Electrical & Electronics: Key Sector to Create Global Champions.* Retrieved from http://www.matrade.gov.my/en/about-matrade/media/pressreleases/3833-electrical-electronics-key-sector-to-create-global-champions.

Mangan, J., Lalwani, C. & Butcher, T. (2008). *Global logistics and supply chain management.* John Wiley & Sons.

McKinsey & Company (2014). Experiential learning environment for lean and digital warehousing at Capability Center Karlsruhe (CCK). Retrieved from http:// capability-center.mckinsey.com/locations/cck-karlsruhe.

Miller, K. E., *&* Smith, L. E. (1983). Handling non-response bias. *Journal of Extention, 49- 50.*

Mizuno, T., Souma, W., & Watanabe, T. (2014). The Structure and Evolution of Buyer-Supplier Networks. *PLoS ONE 9* (7): e100712.

MÍkva,M, Prajováa, V, Yakimovich, B, Korshunov,A, & Tyurin,I (2016). Standardization - one of the tools of continuous improvement. *Procedia Engineering 149,* 329 – 332.

Myebodi. M.Z. (2015). The links between just-in-time practices and alignment of benchmarking performance measures. *The TQM Journal, 27*(1). (Article in press).

Myerson, P. (2012). *Lean Supply Chain and Logistics Management, Lean Warehouse: Low-Hanging Fruit (Chapter 8).* Mc Graw-Hill, Inc.

Miller,L.M. (2011). *Lean Culture - The Leader's Guide.* LMMiller Publishing.

Ministry of International Trade & Industry (MITI) (2017). *Licensed Manufacturing Warehouse* Retrieved from http://www.miti.gov.my.

Moori RG, Pescarmona A, & Kimura H (2013). Lean manufacturing and business performance in Brazilian firms. *J Oper Supply Chain Manag 6*:91–105.

Mpwanya, M.F. (2005). *Inventory Management as a Determinant for Improvement of Customer Service.* Department of Business Management Faculty of Economic and Management Sciences. University of Pretoria.

Muslimen R, Yusof SM, & Abidin ASZ (2011). *A Case Study of Lean Manufacturing. Implementation Approach in Malaysian Automotive Components Manufacturer.*

Mutua, M. (2010). The role of stock control in organizations performance: A case study of Kenya vehicle manufacturers, Thika.

Mustafa, M. S. (2015). *A Theoretical Model of Lean warehousing.* PhD thesis. DOI:10.6092/polito/porto/2588573.

Mustafa, M.S., Cagliano, A.C, & Rafele, C (2013). *A Proposed Framework for Lean Warehousing, Pioneering Solutions in Supply Chain Performance Management. Concepts, Technologies and Applications* / Blecker T., Kersten W., Ringle C.M. JOSEF EUL VERLAG GmbH, Germany.

Morganm N.E.A. & Rego, M. (2005). Understanding Firms Customer Satisfaction Information Usage. *Journal of Marketing, (69),* 131-151.

Nascimento, A. L., & Francischini, P. G. (2004). Caracterização do Sistema de Operações de Serviço Enxuto.PIC-EPUSP, n. 2.

Nadiri, H., Kandampully, J. & Hussain, K. (2009). Zone of tolerance for banks: a diagnostic model of service quality. *The Service Industries Journal, 29*(11), 1547 — 1564.

Namusoke D., (2011). Effects of Inventory Control on the Performance of Construction Companies, Makerere University Printing press, Kampala Uganda.

Narkotey, M.A. (2012). *Inventory management in the Ghana Health Services and Its Role in Healthcare Delivery: A Case study of health facilities in HO Municipality, Kwamen Nkuruma University of science and technology.*

Nath, P., Nacchiapan, S. & Ramanathan, R. (2010). The impact of marketing capability, operations capability and diversification strategy on performance: A resource-based view. *Industrial Marketing Management, 39,* 307–329.

Naude, M.J.A., (2009). *Supply Chain Management Problems experienced by South African Automotive Component Manufacturers.* Doctor of

Commerce in Business Management, University of Pretoria, December 2009.

Nawanir, G., Kong Teong, L., & Norezam Othman, S. (2013). Impact of lean practices on operations performance and business performance: Some evidence from Indonesian manufacturing companies. *Journal of Manufacturing Technology Management*, *24*(7), 1019-1050.

Nawanir, G., Lim, K. T., Othman, S. N., & Adeleke, A. Q. (2018). Developing and Validating Lean Manufacturing Constructs: An SEM Approach. *Benchmarking: An International Journal*, (just-accepted), 00-00.

Neuman, W. L. (2006). *Social Research Methods: Qualitative and Quantitative Approaches*. Boston, Allyn and Bacon.

Nordin N, Md. Deros, B., & Abd Wahab., D. (2010). A Survey on Lean Manufacturing Implementation in Malaysian Automotive Industry. *International Journal of Innovation, Management and Technology, 1*(4). 374-380.

Ohno, R. & Mae, M. (2012). *The Impact of Changing Lead-time on Inbound Logistics.*

Ohno, T. (1988). *Toyota Production Systems: Beyond Large Scale Production.* Diamond Inc: Tokyo.

Oppenheim, A. N. (1 966). *Questionnaire design and attitude measurement.* New York: Basic Books, Inc.

Othman, M., A. (2012). *A Study on LEAN Manufacturing Implementation at Metal Products Industry for Small & Medium Enterprises (SMEs).*

Unpublished Master Thesis, Faculty of Manufacturing Engineering, Universiti Malaysia Pahang.

Overboom, M. A., de Haan J. A. C. and Naus A. J. A. M. (2010). *Measuring the degree of leanness in logistics service providers: Development of a measurement tool,* Porto.

Pallant, J. (2011). *SPSS survival manual: A step by step guide to data analysis using SPSS for windows (41h ed.).* England: McGraw Hill open University Press.

Panizzolo, R., Garengo, P., Sharma, M.K., & Gore, A. (2012). Lean manufacturing in developing countries: evidence from Indian SMEs. *Production Planning & Control, 23*, Iss. 10-11.

Parasuraman, A., Zeithaml, V.A. & Berry, L.L. (1988). SERVQUAL: A Multiple-Item Scale For Measuring Consumer Perceptions Of Service Quality. *Journal Of Retailing, Spring, 64*(1), 12- 40.

Pearl, D.K., & Fairly, D. (1985). Testing for the potential for non-response bias in sample survey. *Public Opinion Quarterly, 49(4): 553-560. Doi:10.1086/268950.*

Penrose, E. (1959). *The theory of the growth of the firm*. Oxford: Oxford University Press.

Perez Toralla, M., Falzon, P. & Morais, A. (2012). Participatory design in lean production: which contribution from employees? For what end? *Work: A Journal of Prevention, Assessment and Rehabilitation, 41*, pp. 2706–2712.

Peteraf, M. A. (1993). The cornerstones of competitive advantage: A Resource Based View. *Strategic Management Journal*, *14*(3), 179–191.

Pingyu, Y., & Yu, Y. (2010). The Barriers to SMEs' Implementation of Lean Production and Countermeasures - Based on SMEs in Wenzhou. International Journal of Innovation, Management and Technology, 1(2). Pirasteh, R. M. & Kannappan, S. (2013). The synergy of continuous process improvement Integrating lean, Six Sigma and theory of constraints can multiply their benefits. *Industrial Engineer*, 42-45.

Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: a critical review of the literature and recommended remedies. *The Journal of Applied Psychology*, *88*(5), 879–903. doi:10.1037/0021-9010.88.5.879.

Psychogios, A.G., Atanasovski, J. & Tsironis, L.K. (2012). Lean Six Sigma in a service context: A multi-factor application approach in the telecommunications industry. *International Journal of Quality & Reliability Management, 29* (1), 122–139.Rad, M.H. (2008). *Lead Time Reduction.* A Case Study of BEAB Etikett & System AB.

Radnor, Z., & Boaden, R. (2008). Editorial: Lean in Public Services – Panacea or Paradox? *Public Money & Management, 1*(28).

Ramunė, C., & Milita, V. (2013). Lean Manufacturing Implementation: The Main Challenges and Barriers. *Management Theory and Studies for Rural Business and Infrastructure Development, 35*(1).

Ramunė, C., & Milita, V. (2012). Lean Manufacturing: Theory and Practice. *Economics and Management, 17* (2) 726-732.

Razmi, J., Hosseini, R. R., & Sangari, M. (2010). Developing a two-echelon mathematical model a vendor-managed inventory (VMI)

system. *International Journal of Advanced Manufacturing Technology*, *48*(5-8), 773-783.

Reich, M (2018). *Yes, Lean is About Cost Reduction.* Lean Enterprises Institute. Retrieved from: http://www.lean.org.

Richards, G. (2014). *Warehouse Management.* London. Kogan Page.

Richardson, T. (2018). *Are You Managing By The Right Numbers*? Lean Enterprises Institute. Retrieved from: http://www.lean.org.

Richardson, E. & Richardson, T. (2017). Build Awareness through Seeing How Eliminating Waste Reduces Costs. Lean Enterprises Institute. Retrieved from: http://www.lean.org.

Rodrigo A. (1996). *Literature Review on Consumer Satisfaction in Modern Marketing.* Seminar in Consumer Research, Faculty of Commerce and Administration, Concordia University.

Rose, A.M.N., Deros, B. Md., Ab. Rahman M.N., & Nordin, N. (2011). *Lean Manufacturing Best Practices in SMEs,* Proceedings of the 2011 International Conference on Industrial Engineering and Operations Management Kuala Lumpur, Malaysia.

Rosenfield & Simchi-Levi (2010). *Designing and managing the supply chain: Concepts, Strategies, and Case Studies (3rd ed.).* New York: The McGraw-Hill Companies.

Ruiz, B., Esteban, A., & Gutierrez, S. (2014). Determinants of reputation of leading Spanish financial institutions among their customers in a context of economic crisis. *BRQ Business Research Quarterly*, *17*(4), 259-278.

Rushton, A., Croucher, P., Baker P. (2006). *The Handbook of logistics and distribution Management. 3rd ed.* Philadelphia. London.

Sabonski (2009). *Assessing Lean Warehousing: Development and Validation of a Lean Assessment Tool* (A PhD Dissertation), Oklahoma State University, USA.

Saifudin, A.M., Zainuddin,N. & Nadarajan, S.S.R (2013). *Warehouse Layout and Efficiency in Small and Medium Enterprises (SMES): A Management Information System Perspective.* Proceedings of 4th International Conference on Education and Information Management, 276-282.

Sainathuni, B., Parikh P. J., Zhang, X & Kong, N (2014). The warehouse-inventory-transportation problem for supply chains. *European Journal of Operational Research*, 237(2), 690-700.

Sanchez, A. M., & Perez, M. P. (2001). Lean indicators and manufacturing strategies. *International Journal of Operations and Production Management, 21*(11), 1433.

Sarkar, D. (2007). Lean for service Organizations and Offices: a holistic approach for achieving operational excellence and improvements. *American Society for Quality.*

Sbihi. A., Eglese R.W. (2010). Combinatorial optimization and green logistics. *Annals of Operations Research, 175*(1), 159-175.

Schmiedel, T., Vom Brocke, J., & Recker, J. (2014). Development and validation of an instrument to measure organizational cultures' support of business process management. *Information & Management*, *51*(1), 43-56.

Schmitt, N., & Stults, D. M. (1985). Factors defined by negatively keyed items: The results of careless respondents? Applied Psychological Measurement, 9(4): 367 373.

Sekaran, U., & Bougie, R. (2013). *Research Methods for Business: A Skill Building Approach.* John Wiley & Sons.

Sekaran, U. & Bougie, R. (2010). Research Methods for Business: *A skill building approach (5th ed.).* Chichester: John Willey and Sons Ltd.

Sekaran, U. (2003). Research methods for business. *A skill-building approach (4th ed.)*. NY: NY: John Wiley & Sons, Inc.

Shah, R., & Ward, P. T. (2003). Lean manufacturing: Context, practice bundles, and performance. *Journal of Operations Management, 21*(2), 129-149.

Shah, R., & Ward, P. T. (2007). Defining and developing measures of lean production. *Journal of Operations Management, 25*(4), 785-805.

Shamah, R.A. (2013). A model for applying lean thinking to value creation. *International Journal of Lean Six Sigma, 4*(2), 204–224.

Sharma. A., Grewal. D., & Levy. M. (1995). The customer satisfaction/ logistics interface. *Journal of Business Logistics, 16*(1), 14-21.

Sheikh, K. (1981). Investigating non-response bias in mail surveys. *Journal of Epidemiology and Community Health, 35,293-296.*

Shingo, S. (1989). A study of the *Toyota Production System: From an Industrial engineering Viewpoint.*

Simon, R.W. & Canacari, E.G. (2012). A practical guide to applying lean tools and management principles to health care improvement projects. *AORN Journal, 95* (1), 85–103.

Singer, E. (2006). Non-response bias in household surveys *Public Opinions Quarterly,* 70 (5) 637-645.

Siriwardena, A.N. & Gillam, S. (2013). Understanding processes and how to improve them. *Quality in Primary Care, 21*(3), 179– 185.

Smaros, J., Lehtonen, J. M., Appelqvist, P., & Holmstrom, J. (2003). The impact of increasing demand visibility on production and inventory control efficiency. *International Journal of Physical Distribution & Logistics Management*, *33*(4), 336-354.

Smith, L., Maull, R. & Ng, I.C. (2014). Servitization and operations management: a service dominant-logic approach. *International Journal of Operations & Production Management, 34(*2), 242–269.

Smith,J.L (2017). *QATS can produce dramatic quality improvements*. Quality Magazine. Available at: https://www.qualitymag.com/articles/93756-quality-at-the-source (Accessed: 27th February 2018).

Sreeshylam, S.T. (2016). Key Performance Indicators (KPI) In Warehouse Management. Retrieved from: www.linkedin.com/pulse/key-performance-indicators-kpi-warehouse-management-sreeshylam.

Steven, A. M., Ram, N., & Hugo, A. DC. (2014). Supply chain design: issues, challenges, frameworks and solutions. *International Journal of Production Research, 52* (7), 1887-1896, DOI: 10.1080/00207543.2013.787175.

Stošić, D., Anđelković, A. & Radosavljević, M. (2016). *The Contribution of the Lean Production Strategy to the Value Creation Process and Competitiveness of the Large Companies in the Republic of Serbia.* University of Novi Sad – Faculty of Economics Subotica.

Straub, D., Boudreau, M.-C. & Gefen, D. (2004). Validation Guidelines For IS Positivist Research. *Communications of the Association for Information Systems, 13,* 380-427.

Stratton, R. and Warburton, R.D.H. (2003) The strategic integration of agile and lean supply. *International Journal of Production Economics*, 85, 185-189.

Stwart, A. D. (2015). *The current understanding of lean warehousing principles in a third-party logistics provider in South Africa.* School of Mechanical, industrial and aeronautical engineering.

Taiichi, O. (1998). *Toyota production system: beyond large-scale production.* Productivity Press.

Taj, S., & Morosan, C. (2011). The impact of lean operations on the Chinese manufacturing performance. *Journal of Manufacturing Technology Management, 22*(2), 223-240, https://doi.org/10.1108/17410381111102234.

Tommelein, I.D., Ballard, G., & Kaminsky, P. (2008). *Supply Chain Management for Lean Project Delivery in Handbook of Construction Supply Chain Management*, Ch. 6, pp. 6-1 to 6-22.

Ton, Z.A. & Raman. (2005). *Cross-Sectional analysis of phantom products at retail stores.* Working papers.

Tracey. M., Leng Tan. C. (2001). Empirical analysis of supplier selection and involvement, customer satisfaction, and firm performance. *Supply Chain Management: An International Journal, 6*(4), 174-188.

Tsaur, S. H., Wang, C. H., Yen, C. H., & Liu, Y. C. (2014). Job standardization and service quality: The mediating role of prosocial service

behaviors. *International Journal of Hospitality Management*, *40*, 130-138.

United Nations Industrial Development Organization (UNIDO) (2018). *Industrial Development Report Breaking In and Moving Up: New Industrial Challenges for the Bottom Billion and the Middle-Income Countries.* ISBN: 978-92-1-106445-2.

Vendan, S. P., & Sakthidhasan, K. (2010). Reduction of Wastages in Motor Manufacturing Industry. *Jordan Journal of Mechanical and Industrial Engineering, 4*(5).

Villa, A.D. (2008). *Lean Transformation Methodology and Implementation in Biopharmaceutical Operation.* (MSc. Thesis). Massachusetts Institute of Technology.

Vikas, S & Vinodh, S. (2016). Deploying Lean Six Sigma framework in an automotive component manufacturing organization. *International Journal of Lean Six Sigma, 7* (3), 267-293, https://doi.org/10.1108/IJLSS-06-2015-0023

Vinas, T. (2013). Lean Warehousing – From Paradox to Operational Excellence. Lean Enterprise Institute. Retrieved from: https://www.lean.org/common/display/?o=2292

Vinodh S, Somanaathan M, & Arvind KR (2013). Development of value stream map for achieving leanness in a manufacturing organization. *J Eng Des Technol 11*(2):129–141. doi:10. 1108/JEDT-01-2010-0007.

Visser, J. J. (2014). *Lean in the warehouse: Measuring lean maturity and performance within a warehouse environment.* Rotterdam School of Management. Erasmus University Rotterdam.

Viswanathan, M., & Kayande, U. (2012). Commentary on "common method bias in marketing: causes, mechanisms, and procedural remedies." *Journal of Retailing*, *88*(4), 556–562. doi:10.1016/j.jretai.2012.10.002.

Vitasek, K., Manrodt, K.B., & Abbott,J (2005). What Makes a Lean Supply Chain. *Supply Chain Management Review.*

Vlachos I, & Bogdanovic A (2013). Lean thinking in the European hotel industry. *Tourism Management 36*:354e–363e.

Vona. R. (2011). Riflessioni sul concetto di distretto logistico. *Sinergie, 56,* 229-250.

Wahab, A. N. A., Mukhtar, M., & Sulaiman, R. (2013). A Conceptual Model of Lean Manufacturing Dimensions. *Procedia Technology,* 11, 1292-1298.

Wan Ibrahim, W.M.K, et al (2017). *Implementing Lean Manufacturing in Malaysian Small and Medium Startup Pharmaceutical Company*. IOP Conf. Ser.: Mater. Sci. Eng. 184, 012016.

Wernerfelt, B. (1984). A resource based view of the firm. *Strategic Management Journal*, *5*(2), 171–180.

Wildding (2003). *The 3 Ts of Highly Effective Supply Chain s: Journal of Supply Chain Practice, (5), 3.*

Wickramasinghe, D., & Wickramasinghe, V. (2011). Perceived organizational support, job involvement and turnover intention in lean production in Sri Lanka. *Int J Adv Manuf Technol, 55*(5–8):817–830.

Womack, J. P. (2006). Why Toyota Won. *Wall Street Journal,* p. A.16.

Womack, J. P. (2002). Lean Thinking: Where Have We Been and Where Are We Going? *Forming & Fabricating.* Lean Manufacturing Special Insert.

Womack, J. P., & Jones, D. T. (1996). *Lean Thinking: Banish Waste and Create Wealth in Your Corporation* (Revised and Updated 2003 ed.). New York: Simon & Schuster.

Womack, J. P., Jones, D.T. and Roos, D. (1990). *The machine that changed the world: The story of lean production - Toyotas secret weapon in the global car wars that is revolutionizing world industry* (1 ed.). New York: Rawson Associates.

Wong, Y.C., Wong, K.Y. & Ali, A. (2009). A Study on Lean Manufacturing Implementation in the Malaysian Electrical and Electronics Industry. European Journal of Scientific Research. Vol. 38 (4): pp. 521-535.

Wong Y C & Wong K Y (2011). *Lean manufacturing framework for the Malaysian electrical and electronics industry.* In: Proceedings of the 3rd International Conference on Information and Financial Engineering.

Worley, J., (2004). *The role of sociocultural factors in a lean manufacturing implementation,* Unpublished Master Thesis, Oregon State University, Corvallis, OH.

Yan, T, Yang, S, &Dooley, K. (2017). A theory of supplier network-based innovation value. *Journal of Purchasing and Supply Management, 23* (3), 153-162.

Yang, M. M., Hong, P. & Modi, B. S. (2011). Impact of Lean Manufacturing and Environmental Management on Business Performance: An

Empirical Study of Manufacturing Firms. *International Journal Production Economics, 129*, *251*.

Yin, R. K. (2008). *Case study research: Design and methods (applied social research methods).* Case study research design and methods.

Yu, C.W. & Kuan, Y. W. (2011). *A Lean Manufacturing Framework for the Malaysian Electrical and Electronics Industry.* 3rd International Conference on Information and Financial Engineering IPEDR vol.12.

Yu, Y., Wang, Z., & Liang, L. (2012). A vendor managed inventory supply chain with deteriorating raw materials and products. *International Journal of Production Economics*, *136*, 266-274.

Zäpfel, G. (1998) Customer – order – driven production An economical concept for responding to demand uncertainty. *International Journal of Production Economic,* 56-57, 699-709.

Zeithaml, V.A. (1988). Consumer Perception of Price, Quality and Value: A Means end Model and Synthesis of Evidence. *Journal of marketing, 52,* 2-22.

Zeithaml V. A., Berry L.L. and Parasuraman A. (1996). The Behavioral Consequences of Service Quality. *Journal of Marketing, 60*, 31-46.

Zerbini, F., Caru, A. & Cugini, A. (2007). The Cost of Customer Satisfaction: A Framework for Strategic Cost Management in Service Industries. *European Accounting Review, (16),* 499-530.

Zhang. Q., Vonderembse. M.A., & Lim. J.S. (2005). Logistics flexibility and its impact on customer satisfaction. *The International Journal of Logistics Management, 16* (1), 71-95.

Zikmund, G.W., Babin, B.J., Carr, J.C., & Griffin, M., (2010). Business Research methods (8th ed.). USA: South Western College Publishing.

Zikmund, W. G. (2000). *Business Research Methods* (6 Ed.): The Dryden Press.

APPENDIX A

QUESTIONAIRE

Survey on LEAN Warehouse Practices & Customer Satisfactions In Penang's

Electrical & Electronics Manufacturing

Dear Sir/Madam,

My name is Adrian Foong Hong Nian. I am currently a doctoral candidate in the College of Business, Universiti Utara Malaysia. As part of the doctoral research, I am conducting a survey among the warehouse managers & senior executives in Penang's Electrical & Electronics manufacturing. The main purpose of this study is to establish the inter-relationship of lean practices of standardization, lean practices of supplier network, lean practices of quality at source and inventory management in warehouse on customer satisfaction in Penang's Electrical & Electronics (E&E).

I would greatly appreciate your participation in this research by completing the enclosed questionnaire. It should require only about 10 to 15 minutes of your time, and your input is most critical to the success of this research. I respect your anonymity and assure you that all information will be held in the strictest confidence. Kindly complete the questionnaire and return it in an enclosed envelope.

Thank you in advance for your participation.

Yours sincerely,

……

Adrian Foong Hong Nian
Othman Yeop Abdullah Graduate School of Business (OYAGSB)
Universiti Utara Malaysia.
Hp: 012-404 0239
Email: hnfoong@gmail.com

SECTION I

This section asks your assessment on how you think (or perceive) your manufacturing warehouse's customer satisfied with your overall warehouse performance.

Please read the following statement and circle the number that most accurately reflects your opinion on each statement based on these scales:

Agree (5), Slightly Agree (4), neither Agree nor Disagree (3), Slightly Disagree (2) Disagree (1)

1	Work in process (WIP) inventory level has significantly reduced	5	4	3	2	1
2	Raw material inventory level has significantly reduced	5	4	3	2	1
3	Finished goods inventory level has significantly reduced	5	4	3	2	1
4	Overall inventory level has significantly reduced	5	4	3	2	1
5	Storage space requirement has significantly reduced	5	4	3	2	1
6	Inventory turnover has increased (inventory turnover is ratio of cost of goods sold and average aggregate inventory cost)	5	4	3	2	1
7	Over productions that cause high inventory level have been successfully eliminated	5	4	3	2	1

SECTION II

This section asks your opinion (perception) on the importance of having the Lean practice of standardization in your manufacturing warehouse operation.

Please read the following statement and circle the number that most accurately reflects your opinion on each statement based on these scales:

Agree (5), Slightly Agree (4), neither Agree nor Disagree (3), Slightly Disagree (2) Disagree (1)

1	There are comprehensive standard operating procedures at this company	5	4	3	2	1
2	We are told to follow strict operating procedures at all times	5	4	3	2	1
3	Whatever situation arises, they have procedures to follow in dealing with it	5	4	3	2	1
4	Our company effectively uses automation to achieve consistency in serving customers	5	4	3	2	1
5	Every employee has specific operating procedures to follow	5	4	3	2	1

SECTION III

This section asks your opinion about Lean practice of supplier network in your manufacturing warehouse operation.

Please read the following statement and circle the number that most accurately reflects your opinion on each statement based on these scales:

Agree (5), Slightly Agree (4), neither Agree nor Disagree (3), Slightly Disagree (2) Disagree (1)

1	We regularly solve problems jointly with our suppliers.	5	4	3	2	1
2	We emphasize to work together with suppliers in a close relationship for mutual benefits.	5	4	3	2	1
3	Our suppliers deliver materials/products to us just as it is needed (on a just-in-time basis)	5	4	3	2	1
4	Our suppliers maintain a warehouse near to our plant.	5	4	3	2	1
5	Engineering and quality management assistance are commonly provided to the suppliers	5	4	3	2	1
6	We can depend upon on-time delivery from our suppliers.	5	4	3	2	1
7	We have long-term agreements with our suppliers.	5	4	3	2	1
8	We strive to establish long-term relationships with suppliers.	5	4	3	2	1

SECTION IV

This section asks your opinion about Lean practice of quality at source in your manufacturing warehouse operation.

Please read the following statement and circle the number that most accurately reflects your opinion on each statement based on these scales:

Agree (5), Slightly Agree (4), neither Agree nor Disagree (3), Slightly Disagree (2) Disagree (1)

1	We use statistical techniques to reduce process variances	5	4	3	2	1
2	We use visual control systems (such as line stop alarm light, level indicator, warning signal, signboard, etc.) as a mechanism to make problems visible	5	4	3	2	1
3	Production processes on production floors are monitored with statistical quality control techniques	5	4	3	2	1
4	Quality problems can be traced to its source easily	5	4	3	2	1
5	Production workers can identify quality problems easily	5	4	3	2	1
6	Production workers are authorized to stop production if serious quality problems are occurred	5	4	3	2	1

7	We have quality focused teams that meet regularly to discuss about quality issues	5	4	3	2	1
8	Production workers are trained for quality control	5	4	3	2	1

SECTION V

This section asks your opinion about Lean practice of inventory management in your manufacturing warehouse operation.

Please read the following statement and circle the number that most accurately reflects your opinion on each statement based on these scales:

Agree (5), Slightly Agree (4), neither Agree nor Disagree (3), Slightly Disagree (2) Disagree (1)

1	Work in process (WIP) inventory level has significantly reduced	5	4	3	2	1
2	Raw material inventory level has significantly reduced	5	4	3	2	1
3	Finished goods inventory level has significantly reduced	5	4	3	2	1
4	Overall inventory level has significantly reduced	5	4	3	2	1
5	Storage space requirement has significantly reduced	5	4	3	2	1

6	Inventory turnover has increased (inventory turnover is ratio of cost of goods sold and average aggregate inventory cost)	5	4	3	2	1
7	Over productions that cause high inventory level have been successfully eliminated	5	4	3	2	1

SECTION V

This section asks for some background information. Please be assured that your responses to these questions are confidential. Please tick [/] in the relevant box for each question.

What is your gender?

Male		Female	

2. What is your age?

Under 19	
19-30	
31-40	
41-50	
Above 50	

3. What is your ethnic group?

Malay	
Chinese	
Indian	
Bumiputra Sabah & Sarawak	
Others: Please specify	

4. How many years of working experience do you have in warehouse operation?

1-5 years	

6- 10 years	
11– 20 years	
More than 20 years	

5. How many years have you been working in the present organization?

1-5 years	
6- 10 years	
11– 20 years	
More than 20 years	

6. What is your highest educational qualification?

SPM/MCE/O-LEVEL	
STPM/HSC/A-LEVEL	
Diploma Level	
First Degree	
Postgraduate	

THANK YOU FOR PARTICIPATING IN THIS SURVEY

APPENDIX B

List of Penang E&E Manufacturers with Warehouse Facilities

ABBOTT MEDICAL MANUFACTURING (M) SDN BHD

ADVANTEST (M) SDN BHD

AGILENT TECHNOLOGIES LDA MALAYSIA SDN. BHD.

AIC SEMICONDUCTOR SDN BHD

AMBU TECHNOLOGIES (M) SDN BHD

ASE ELECTRONICS (M) SDN BHD

AUTOMOTIVE LIGHTING SDN BHD

B BRAUN MEDICAL SUPPLIES SDN BHD

BAYSAND SEMICONDUCTOR (M) SDN BHD

BENCHMARK ELECTRONICS (M) SDN BHD

BENQ SDN BHD

BOSTON SCIENTIFIC MEDICAL DEVICE (MALAYSIA) SDN. BHD.

BRADY TECHNOLOGY SDN BHD

BROADCOM INC (FORMERLY AVAGO TECHNOLOGIES)

CANON ELECTRONICS

CARSEM (M) SDN. BHD.

CELESTICA MALAYSIA SDN. BHD.

CEPCO ELECTRONICS (M) SDN BHD

CLARION (M) SDN BHD

CLASSIC ADVANTAGE SDN BHD

CONTINENTAL AUTOMOTIVE COMPONENTS MALAYSIA SDN. BHD

CREE PENANG MALAYSIA SDN. BHD.

CYPRESS MALAYSIA SEMICONDUCTOR SDN BHD

DELL COMPUTERS (M) SDN BHD

ELNA PCB (M) SDN BHD

ESCATEC ELECTRONICS SDN BHD

FASTRON (M) SDN BHD

FIRST SOLAR TECHNOLOGIES (M) SDN BHD

FLEX LTD (FLEX SYSTEMS PENANG) (FORMERLY BOSE MALAYSIA)

FLEXTRONICS TECHNOLOGY (M) SDN BHD

FU HAO MANUFACTURING (M) SDN BHD

FUJI ELECTRIC (MALAYSIA) SDN BHD

GES MANUFACTURING SERVICES (M) SDN BHD (VENTURE)

HAEMONETICS MALAYSIA SDN BHD

HEWLETT PACKARD MALAYSIA MANUFACTURING SDN BHD

HONEYWELL AEROSPACE AVIONICS MALAYSIA SDN. BHD.

HOYA ELECTRONICS (M) SDN. BHD.

IBIDEN ELECTRONICS MALAYSIA SDN BHD

INFINEON TECHNOLOGIES (MALAYSIA) SDN BHD

INTEGRATED DEVICE TECHNOLOGY (M) SDN BHD

INTEGRATED DEVICE TECHNOLOGY (MALAYSIA) SDN.BHD.

INTEL MICROELECTRONICS (M) SDN. BHD

JABIL CIRCUIT SDN. BHD.

JINKO SOLAR TECHNOLOGY SDN BHD

KESP SDN BHD

KEYSIGHT TECHNOLOGIES MALAYSIA SDN. BHD.

KNOWLES ELECTRONICS (M) SDN. BHD.

KOBE PRECISION TECHNOLOGY (M) SDN. BHD.

KONTRON ASIA PACIFIC DESIGN SDN BHD

LAKE REGION MEDICAL SDN BHD

LINEAR SEMICONDUCTOR SDN. BHD.

LINTEC INDUSTRIES (MALAYSIA) SDN BHD

LUMILEDS MALAYSIA SDN BHD

MICRO-MECHANICS TECHNOLOGY SDN BHD

MOLEX (MALAYSIA) SDN BHD

MOTOROLA SOLUTIONS MALAYSIA SDN BHD

MOTOROLA SOLUTIONS MALAYSIA SDN BHD

MURATA ELECTRONICS (M) SDN. BHD.

NATIONAL INSTRUMENTS (M) SDN BHD

NXP SEMICONDUCTORS MALAYSIA SDN BHD

OPTICS BALZERS MALAYSIA

OSRAM KULIM (M) SDN BHD

OSRAM OPTO SEMICONDUCTORS (M) SDN. BHD.

PACTECH ASIA SDN. BHD.

PANASONIC AUTOMOTIVE SYSTEMS MALAYSIA SDN. BHD.

PHISONTECH ELECTRONICS (MALAYSIA) SDN BHD

PLEXUS MANUFACTURING SDN BHD.

RENESAS SEMICONDUCTOR (MALAYSIA) SDN BHD

ROBERT BOSCH (MALAYSIA) SDN. BHD.

ROBERT BOSCH POWER TOOLS SDN BHD

ROBERT BOSCH AUTOMOTIVE STEERING SDN BHD

SAM ENGINEERING & EQUIPMENT (M) BERHAD

SANDISK STORAGE MALAYSIA SDN BHD

SANMINA-SCI SYSTEMS (M) SDN. BHD

SANYO ELECTRIC PENANG SDN BHD

SHARP ROXY CORPORATION (M) SDN. BHD.

SIEMENS VDO COMPONENTS MY SDN. BHD.

SMART MODULAR TECHNOLOGIES (M) SDN BHD

SONY EMCS MALAYSIA SDN. BHD.

ST. JUDE MEDICAL OPERATIONS SDN BHD

STEC TECHNOLOGY SDN BHD

SWISS PROFILE (M) SDN BHD

SYMMETRY MEDICAL MALAYSIA SDN BHD

TANAKA ELECTRONICS MALAYSIA SDN. BHD.

TECO INDUSTRY (MALAYSIA) SDN. BHD.

TELEFLEX MEDICAL SDN BHD

TELEPLAN TECHNOLOGY SERVICES SDN. BHD.

TF AMD MICROELECTRONICS (PENANG) SDN. BHD.

UCHI OPTOELECTRONIC (M) SDN. BHD.

VALEO MALAYSIA CDA SDN BHD

VAT MANUFACTURING MALAYSIA SDN BHD

VENTURE ELECTRONICS SERVICES (M) SDN. BHD.

WESTERN DIGITAL (MALAYSIA) SDN. BHD.

WESTERNGECO PENANG (SCHLUMBERGER)

Source: Federation of Malaysia Manufacturer - Northern Branch, 2018