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A STUDY OF LEAN PRODUCTION AND FIRMS' PROFITABILITY (A CASE OF IRANIAN INDUSTRIAL TOWNSHIP)

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ABSTRACT

The aim of the present study is to investigate the relationship between lean production and firm's profitability of 75 manufacturing companies in Parand industrial township of Tehran. A total of 180 questionnaires were distributed among respondents and 137 usable questionnaires were returned. Factor analysis and the findings show that lean production has a significant positive influence on the profitability of the selected companies. The results of the current study implies that lean production and its related concept need to be understood by managers and business owners in order to increase firms' profitability.

KEYWORDS: *Lean Production, Profitability, Sem Analysis.*

1. INTRODUCTION

In the recent competitive economy, to be successful, it is important to create value for the end customers. Value is defined as activities or processes that customers would be willing to pay for. According to (Womak et al., 1990; Holweg, 2007), lean is centered on preserving value with less work. Lean manufacturing is a management philosophy derived mostly from the Toyota Production System (TPS) (hence the term Toyotism is also prevalent) and identified as "Lean" only in the 1990s. As Bailey (2008) discussed, TPS is famous for its focus on reduction of the original Toyota seven wastes to improve overall customer value. The steady growth of Toyota, from a small company to the world's largest company is an important issue which needs to be considered (Bertagnolli, 2022).

As inferred, reducing wastes and creating value for customers will have many positive consequences for any companies. As reducing wastes concerned, Lean production affects organizational success by saving materials and money for companies (Helmold & Samara, 2019). It let companies to receive more money from fewer materials. As creating value for customers concerned, Lean production helps companies to recognize customers' needs correctly, and provide situation to satisfy these needs effectively. The ultimate results of this process will be customers' loyalty. Thus, having loyal and satisfied customers causes efficiency, effectiveness, and market share for any companies (Helmold, 2020).

There is little attention given to research on the relationship between lean production and firms' profitability. Thus, the present study attempts to propose a framework on the mentioned topic among 50 manufacturing companies in Parand Abad industrial township of Tehran.

Lean Production

Lean principles came from the Japanese manufacturing industry. The term was first coined by John Krafcik in his 1988 article, "Triumph of the Lean Production System," based on his

master's thesis at the MIT Sloan School of Management (Krafcik, 1988) The main objective of lean production is to eliminate wastes and Toyota defined three broad types of waste: muda, muri and mura; it should be noted that for many Lean implementations this list shrinks to the first waste type only with corresponding benefits decrease. To illustrate the state of this thinking Shingo observed that only the last turn of a bolt tightens it—the rest is just movement. This ever finer clarification of waste is key to establishing distinctions between value-adding activity, waste and non-value-adding work (Taichi Ohno, 1988).

Firstly, muri focuses on the preparation and planning of the process, or what work can be avoided proactively by design. Next, mura then focuses on how the work design is implemented and the elimination of fluctuation at the scheduling or operations level, such as quality and volume. Muda is then discovered after the process is in place and is dealt with reactively. It is seen through variation in output (Hosseini et al., 2015).

According to Womak and Daniel (2003), the original seven muda are:

- Transport (moving products that are not actually required to perform the processing)
- Inventory (all components, work in process and finished product not being processed)
- Motion (people or equipment moving or walking more than is required to perform the processing)
- Waiting (waiting for the next production step)
- Overproduction (production ahead of demand)
- Over Processing (resulting from poor tool or product design creating activity)
- Defects (the effort involved in inspecting for and fixing defects)

Research model and hypothesis

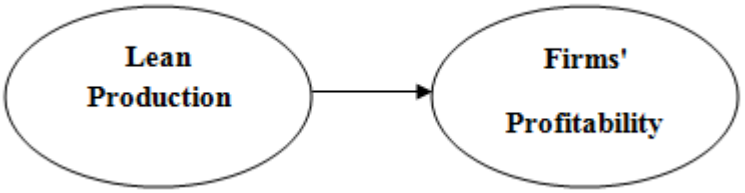

Figure 1 Research proposed model

H_1: Lean production has a significant positive impact on firms' profitability.

2. METHODOLOGY

Statistical population

Statistical population of this study includes 50 manufacturing companies Parand Abad of Tehran. Senior managers, middle managers, and financial managers, and procurement/purchasing managers were considered as appropriate respondents for this research. After distribution of 200 questionnaires among respondents, 137 usable questionnaires were returned. Table 1 shows the descriptive statistics of the respondents.

Table 1. Description of the respondents

Item	Description	Frequency	Percentage
Gender	Male	98	72%
	Female	39	28%
Organizational status	Financial managers	51	37%
	Procurement/purchasing managers	26	19%
	Senior managers	27	20%
	middle managers	33	24%
Education	Bachelor	67	49%
	Master	48	35%
	PhD	22	16%

Instrument

In order to collect the necessary data, a questionnaire was used to test the hypothesis of the study. To design the questionnaire for measuring research variables and scale development, we used Churchill (1979) scale development method. First, we defined the domain of each construct, deciding what would be included and excluded. Then, an extensive review of literature has been done in order to identify questions measuring each variable and relevant scale. To that end, it has been tried to adopt or adapt the most repetitive questions in the literature for increasing the questionnaire validity.

We used five-point Likert type scale for all the items. Response categories range from 1 (strongly disagree) to 5 (strongly agree). After finalizing the questionnaire, 20 of them have been sent to respondents, resulted in changing and in some cases, eliminating some of the questions; this last version of the questionnaire has been used for data collection. The questionnaire consists of two parts; first part consisted of three questions which is shown in table 2; and the second part consisted of 40 questions measured the research variables; 20 questions used for measuring lean production, and 20 questions for measuring firms' profitability.

Reliability and validity

The summary statistics of formal survey are shown in Table 2. For reliability evaluation we utilized Cronbach's alpha. The Cronbach's alpha reliability of all variables are more than 0.7 (α>0.7), which indicates all scales demonstrate good reliability.

Table 2 Reliability test

Instrument	N	Cronbach's alpha
Lean production	20	0.793
Profitability	20	0.813

We used factor analysis for considering the structure of research. Confirmatory factor analysis was used to investigate the construction of the questionnaire as follows:

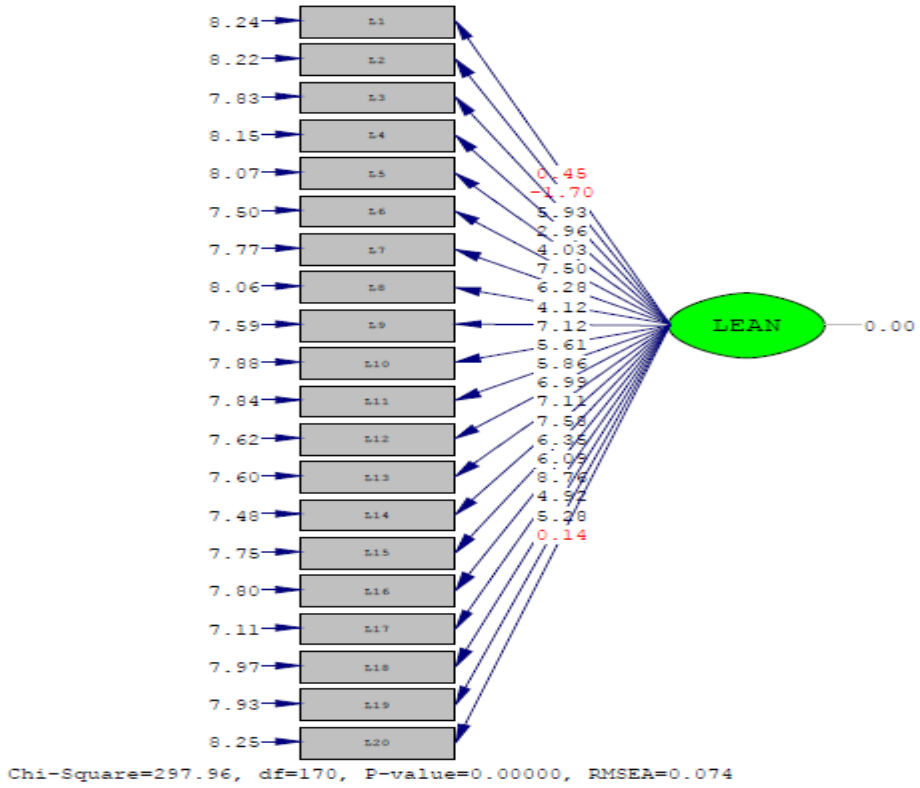

Figure 2 Measurement model of lean production

As can be seen, questions 1, 2, and 20 have no significant influence with lean production. Thus, those three questions were eliminated for our SEM analysis.

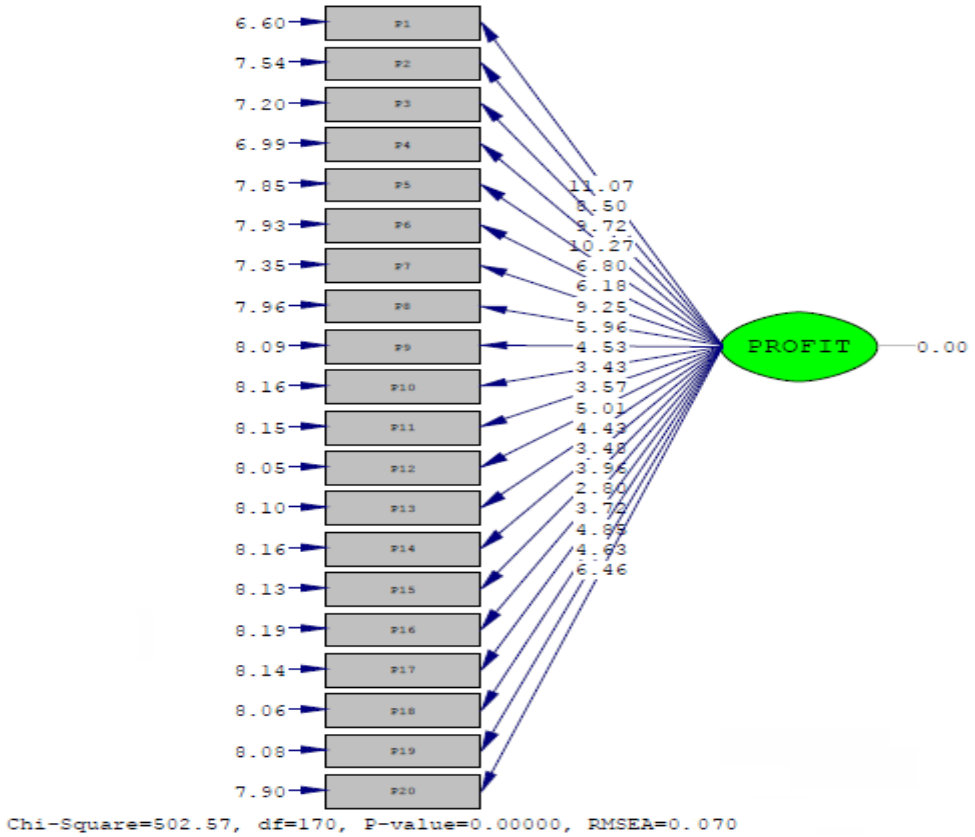

Figure 3 Measurement model of firms' profitability

As can be seen, the t-value of all questions are above 1.96; which means that all items have significant influence with firms' profitability and remain in our SEM model.

3. RESULTS

In this study, the relationship between lean production and firms' profitability were tested using the SEM technique. For testing our hypothesis, we performed our structural model applying 17 questions of lean production and 20 questions of firms' profitability. Figure 4 shows the results of the SEM analysis. Fitness's indices also show good fitness of the Structural model.

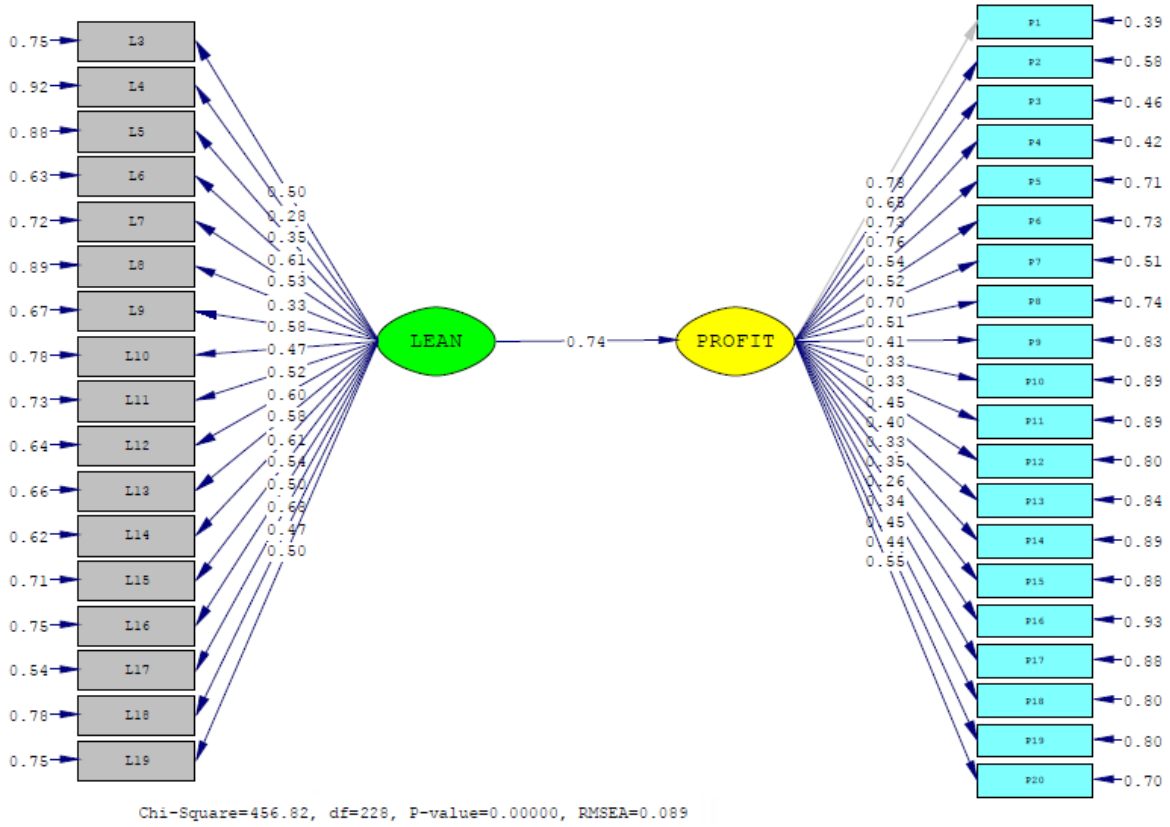

Figure 4 Structural equation models

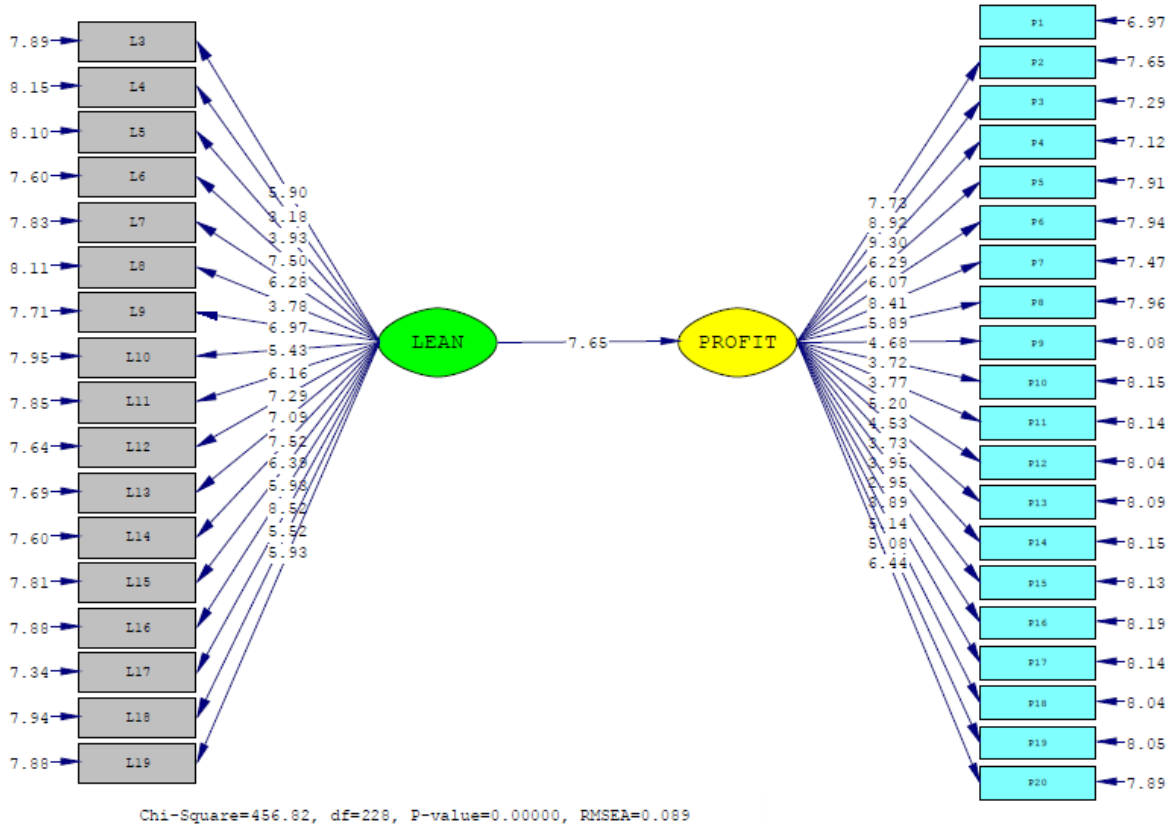

Figure 5 T-value tests

Based on the results of SEM analysis, our hypothesis is confirmed. Table 3 summarizes the hypothesis test results in terms of path coefficients (standardized) and t-value as follows:

Table 3 The results of the hypothesis test

No	Hypothesis	Path coefficient	t-value	Result
H_1	Lean production → Firms' profitability	0.74	7.65	Accepted

4. DISCUSSION

The aim of the current study is to investigate the relationship between lean production and firms' profitability of 50 manufacturing companies in Tehran, Iran. Because of today's competitive environment, only companies can survive who gain more profit than others. Therefore, examining factors contribute to increasing in the level of firms' profitability have always been of particular interest of managers and business owners.

In this study, we focused on lean production and its relationship with firms' profitability. Based on the information of Parand Abad industrial township of Tehran, we chose 50manufacturing companies as the statistical population of our research. The results of our research established that lean production of those selected companies has a significant positive impact on their profitability. The findings of our research provide further insight on applying lean production to achieve superior performance.

For managers of organizations is to distinguish customers' needs and try to satisfy their needs. Further, managers should try their best to eliminate wastes in their organizations. The ultimate result of these processes will be firms' profitability.

REFERENCES

1. Womack, James P.; Daniel T. Jones, and Daniel Roos (1990). The Machine That Changed the World.

2. Holweg, M. (2007). "The genealogy of lean production". Journal of Operations Management 25 (2): 420–437. doi:10.1016/j.jom.2006.04.001.

3. Bailey, D. (2008). "Automotive News calls Toyota world No 1 car maker". Reuters.com. Reuters. Retrieved 19 April 2008.

4. Krafcik, John F. (1988). "Triumph of the lean production system". Sloan Management Review 30 (1): 41–52.

5. Taichi Ohno, (1988). Toyota Production System, Productivity Press, p. 58

6. Womack, James P., Daniel T. Jones (2003). Lean Thinking. Free Press. p. 352.

7. Helmold, M., & Samara, W. (2019). Progress in performance management. Industry insights and case studies on principles, application tools, and practice. Heidelberg: Springer.

8. Helmold, M. (2020). Principles of a Lean Production System. In: Lean Management and Kaizen. Management for Professionals. Springer, Cham. https://doi.org/10.1007/978-3-030-46981-8_9

9. Bertagnolli, F. (2022). Introduction Lean Production. In: Lean Management. Springer, Wiesbaden. https://doi.org/10.1007/978-3-658-36087-0_1

10. Hosseini, A., Kishawy, H.A., Hussein, H.M. (2015). Lean Manufacturing. In: Davim, J. (eds) Modern Manufacturing Engineering. Materials Forming, Machining and Tribology. Springer, Cham. https://doi.org/10.1007/978-3-319-20152-8_8