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Role of Lean, Environmental and Social Practices to Increasing Firm's Overall Performance

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Abstract
The companies face a competition increasingly sharp. In this context, the adoption of Lean practices is highly demanded. It aims to accelerate the flow, to reduce non-value added, as part of a continuous improvement process. Furthermore, since the 90s, sustainable development is a growing interest. Corporate social responsibility (CSR) is the firms contribution to sustainable development issues. This approach is for companies to take into account the social and environmental impacts of their activity to adopt the best possible practices and contribute to the betterment of society and the protection of the environment. Literature suggests that selected stand-alone practices of lean, environmental and social have a positive impact on firm sustainability performance. Our goal in this study is to show the impact of deferent combinations of lean, environmental and social practices on firm financial, environmental, social, and overall performance.

Keywords : Lean;Environmental; Social; Corporate Social Responsibility (CSR); Overall performance

1. Introduction
The lean production system has been widely accepted in the general manufacturing field, and firms have witnessed considerable financial benefits through implementing lean management systems . Environment and social management systems have also been proven to have positive impacts on firm performance in various aspects . Till now, however, these management systems have only been studied in isolation, with existing studies focusing on either environmental issues or CSR-related problems . To appreciate sustainability in a more comprehensive sense, these three streams of literature need to be simultaneously considered. Furthermore, the influence of individual practice on overall performance is not fairly distributed and mandates a set of practices to meet the expected requirements in the three dimensions of performance.
Therefore, to bridge this research gap and develop a comprehensive framework of sustainability,
important lean, environmental, and social practices selected from each management system are integrated in this paper. The resultant integration of these practices is referred to as LES (Lean, Environmental and Social) practices. In previous studies, the selected practices have so far only been independently dealt with or combined as a pair such as LE rather than as a triad. The combination of selected practices from each management system suggested in this paper will enable firms to enhance their overall performance. The purpose of this article is to gain a deeper understanding of the relationship between overall performance and LES practices, the business value of sustainability, managerial positions and abilities needed to foster creation and innovation. This research makes conceptual and methodological contributions to raise overall performance of companies through the combination of lean, environment and social as a single unit.

2. Literature review
2.1. Lean management system
Lean is a constantly moving process. There is no end to continuous improvement. This approach consist on quality, delivery on time and reduce costs and waste, streamlining organizations and processes, can help us to reduce stocks, assets, required operational space and cycle time, execution time and delivery time. Lean can

lead to significant and measurable improvements in quality. Most tools focus on very simple concepts and are easy to use and implement. It focuses on the visible, what we can see, change and control. It connects steps, processes and people. It identifies waste and problems. It allows us all to identify and resolve errors more quickly and efficiently. Finally, it saves even more money throughout the process. There's nothing really complicated or mysterious. Anyone can apply it in its firm, no matter the industry concerned. It can be an excellent tool to mobilize our organization. Lean toolbox has basic tools. This toolkit will allow us to systematically and constantly changing inefficient processes to transform production lines a fluid process. It offers everyone the opportunity to "take control" and gives pride in the work they do. It is a practical tool, when people understand what affects the processes and results.

2.2. Environmental management system

Companies are becoming increasingly concerned about the environment. This concern is best illustrated in their adoption of environmental management systems. Previous research suggests two forms of environmental management: internal (green production) and external (green supply chain management) [1,2]. While green production aims to achieve greenness and sustainability at the manufacturing stage, green supply chain management pursues the same goal by making strategic decisions by cooperating with external partners [2]. These two aspects of environmental management, though having different focuses, aim to reduce the negative environmental impacts of firms' activities.

Commonly used green production practices discussed in the existing literature include environmental design, raw material reduction (both in terms of quantity and variety), as well as green manufacturing [3]. By engaging in such activities, firms can reduce the negative impact of their products and production process on the natural environment, which may create a long-term financial benefit for them [4].

A popular topic in sustainability research, the relationship between environmental management practices and various aspects of firm performance is well researched [2,5,6]. The positive impact of environmental management practices on financial performance was found by some to be mediated by enhanced environmental performance [4,7], while others found this relationship to be bidirectional, as financially stronger firms tend to experience a more positive effect from environmental management adoption [2,8].

The positive effects of environmental management practices on financial performance in an emerging economy context is confirmed [9]. The implementation of environmental management practices impacts environmental and social performance through reducing resource consumption and improving stakeholder relations [10] .

2.3. CSR management system

There is no single, commonly accepted definition of CSR, which contributes to the confusion about issues and topics included in the CSR subject.

Following the Green Paper of the European Commission on CSR (European Commission 2001), CSR can be defined as the concept that "companies integrate social, environmental and economic concerns in their daily operations and in their interaction with their stakeholders on a voluntary basis. This definition emphasizes the following points:

- CSR covers social and environmental matters despite the English term "corporate social responsibility", which could only focus on the social dimension.
- CSR is not and should not be separated from the strategy and operations business: since this is to integrate social and environmental concerns in these strategies operations.
- CSR is a voluntary concept.
- An important aspect of CSR is how enterprises interact with their internal and external stakeholders (employees, customers, neighbors, non-governmental organizations, public authorities,...).
- It is important to stress that being socially responsible does not mean only to comply with the legislation concerned, but also going beyond compliance and investing more than required in human capital, the environment and stakeholder relations.
- Each company is involved in CSR in its own way, which does not depend only its core competencies, resources and stakeholder interests but also the cultural traditions of the country and the area where the company is located.

One of the most notable recent contributions is given by the approach "Triple Bottom Line" (the three pillars of sustainable development), a term coined by John Elkington in 1998. The idea behind this concept is that for a

company be sustainable, it must be financially secure, it must minimize (and ideally eliminate) its negative environmental impacts, and finally, it must act in accordance with social expectations.
As can be seen, CSR is an integral part of the sustainability concept, in the sense that it can be understood as the business contribution to sustainable development. In this context, social and environmental responsibilities are not separate but related.

2.4. Alliance among lean, green, and CSR Management Systems
The synergistic relationship between lean and green has been well studied [11,12]. King and Lenox [11] found that firms' adoption of quality management standard ISO 9001 is positively related to the adoption of environmental management standard ISO 14001. By implementing lean practices, firms reduce resource use waste and emissions, an objective shared by green practices [11,12]. In general, we can conclude that there is a mutual facilitation between lean and green practices implementation.
With respect to the relationship between lean and social practices, there has been no systematic analysis so far. Most studies regard firms' human resources as the connecting point between lean and social practices [13]. Empowering and educating the employees facilitates their self-development. Besides, TPM activities largely prevent workplace injuries and deaths, contributing to better employee health and safety [14]. As we adopt a stakeholder perspective for social practices [15], customers, suppliers, and the community also need to be taken into account as important stakeholder groups. Lean practices impact customers mainly through TQM programs, as customers are paying increasing attention to product quality these days. The synergistic effects among practices of lean, green, and social management systems are important in firms' decision-making on integrating these practices.

2.5. Firm's overall performance
The performance has long been reduced to its financial dimension. This performance was to achieve the desired profitability by shareholders with revenue and market share that preserved the continuity of the firms. But in recent years, there is schematically move from a financial representation of the performance to approaches more global including social and environmental dimensions. Other actors (stakeholders) have emerged and the concept of performance knew a renewed use. Now the survival of firms no longer depends solely on the financial side of their activities, but also how they behave. Therefore, firm's responsibility is growing, it is no longer limited only to direct shareholders, but incorporates other stakeholders (associations, NGOs, trade unions, customers, suppliers,...). These new actors require to be heard and that listening becomes a vital target for the firm's performance and sustainability. It is in this context appears the concept of overall performance which encompasses three dimensions: economic, environmental and social.

3. Research Methodology
Our research methodology for evaluating the overall performance is based on a qualitative method, type "search-intervention". This is an action research, that is to say research that is both an advancement of knowledge (theoretical or practical) and an action in the middle. This search method attempts to answer two types of questions: How? , and why ? Therefore, our intervention research aims to evaluate the performance model through the question of why and how this integrated model Lean, Green and social impacts the balanced performance "3P" (People, Profit, Planet)?

3.1. Case study
We identified three categories of firms from Tangier Free Zone (TFZ) in southern Morocco: big and famous firms with more than 3000 employees (category F_1), medium-sized firms with 1000–3000 employees (category F_2), and small firms with less than 1000 employees (category F_3). We chose randomly 3 companies (f_1, f_2 and f_3) from each category (Table 1).

3.2. Observations
We started our investigation by asking the respondents if their companies are currently implementing
and respect many practices of Lean,enverenemental and social carefully selected. Each one of them answered that effectively their companies are engaged in these kinds of sustainable practices. We based a code of "low", "medium", and "high" to interpret their extent of implementation of each practice.

We choose TPM for instance. There are sixteen points in TPM practice (Appendix A). If the respondent expresses that his firm implements eight practices, we label its implementation level of TPM as "medium". The same, if two other firms implement respectively, five and thirteen points, we label thier implementation level of TPM as "low" and "high" respectively.

Table 1: characteristics of the seven firmes studied

		Activity	Age	N° of employees	Respondent
Category F1	Firm 1	Automotive wiring	12	3150	Responsible of continuous improvement
	Firm 2	Automotive wiring	20	5600	Plant manager
	Firm 3	Seats automotive	13	4000	Quality manager
Category F_2	Firm 4	Automotive components	7	1732	Operation manager
	Firm 5	Children's games	6	1500	Responsible of health, safety and environment
Category F_3	Firm 6	Supplier of tables for automotive wiring	5	76	Production responsible
	Firm 7	Supplier of fixtures for automotive wiring	10	150	Technical director

Table 2: Summary of results

		Category X			Category Y		Category Z	
Dimension	Practices	Firm 1	Firm 2	Firm 3	Firm 4	Firm 5	Firm 6	Firm 7
Lean practices	Just-in-time	4	3	3	4	2	3	3
	Kanban	4	3	3.5	4	2	2	3
	TPM	4	3	3	4	1.5	2	2
Environmental practices	Management environnemental	3	4	2	3	3	4	2
	Use of resources	4	3	2.5	2.5	3	3	1
	Pollution	4	3.5	1.5	2	3.5	4	2.5
Social practices	Work conditions	3	2	3	2	3	2	3.5
	Health and security	4	2.5	3	2.5	3	2.5	3
	Labor rights	3	2	3.5	3	2	3	3
Overall performance		3.5	3	3	2.5	3	2.5	2.5

4. Discussion of results

Correlation analysis was conducted to investigate the strength and direction of the relationship between each sustainable dimension (lean, environment and social) and overall performance for the three categories of firms.

4.1. Lean, environmental and social (LES) practices together and firm's overall performance

Results show clearly that a combination of lean, environmental and social (LES) practices contributes significantly to overall performance. LES practices together can provide firms with the sustainable development they are pursuing [16] . The result provides strong evidence that firms can improve their overall performance through an integrated implementation of LES practices.

Respondents from all case firms expressed clearly the benefits brought by LES practices since implementation. Besides, according to the respondents, it is impossible to ignore any of the practices due to stakeholder requirements in the current business environment. However, they have all experienced the benefits brought by LES practices such as financial gains, regulation compliance and the avoidance of penalty, talent and higher employee retention, and better position in the marketplace and enhanced reputation.

Outcome 1: LES practices together impact positively firm's overall performance.

4.2. Lean practices and firm's overall performance

The relationship between lean and overall performance as a whole is positive and significant. As a popular practice for waste reduction and efficiency improvement, together with its role in empowering and enlightening firms' human resources, lean simultaneously enhances firm overall performance. So, lean can be considered as a sustainable practice.

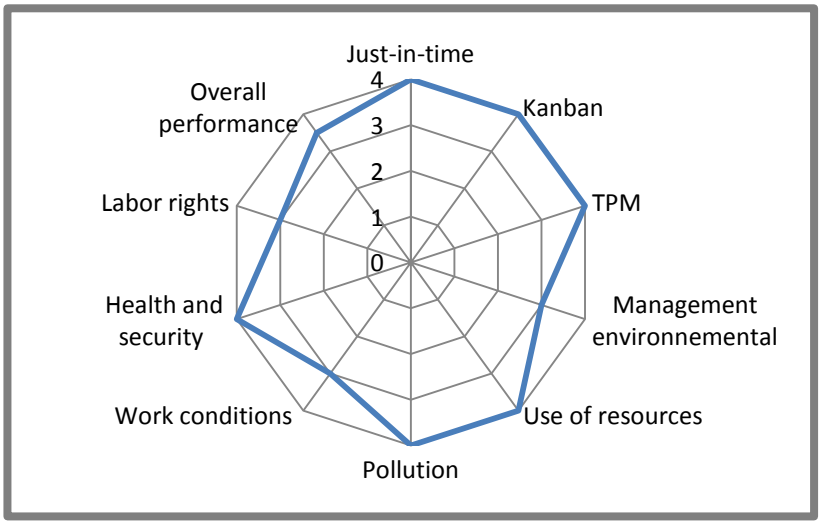

Figure 1: Correlation LES practices together and firm's overall performance (Firm 1)

Relationship between lean practices and overall performance is less significant when compared with LES practices together (Figures 1 & 2). All firms suggested that lean practices are adopted to improve efficiency rather than to achieve environmental or social benefits.

Outcome 2: Lean practices are positively related to firm economic, and overall performance.

Outcome 3: lean practices only have less positive impact on firm's overall performance compared with integrated LES practices.

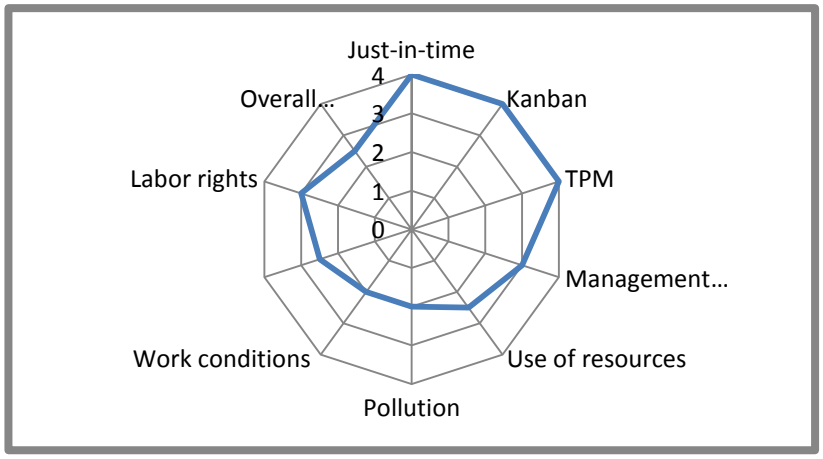

Figure 2: Impact of Lean practices on firm's overall performance (Firm 4)

4.3. Environmental practices and firm's overall performance

Based on some interviews regarding environmental practices, it is clear that measures taken to reduce raw material consumption, to control emission and discharge, and to increase recycling and waste management can

at least to some extent result in decreased raw material consumption, emission, waste water generation, and energy use. A possible explanation would be that both directly and indirectly, environmental practices contribute to the improvement of firm's overall performance.
There is a strong positive relationship between environmental practices and overall performance as a whole. All case firms, confirmed two main drivers that influence them to implement environmental practices: the potential financial benefits and environmental regulations. So far, the financial benefits realized include reduced cost, more stable contracts with business partners, and a reduced amount of penalties achieved from improved environmental performance. Environmental practices thus benefit every dimension of overall performance.

Outcome 3: Environmental practices are positively related to firm's overall performance.

Outcome 4: Environmental practices only have less positive impact on firm's overall performance compared with integrated LES practices.

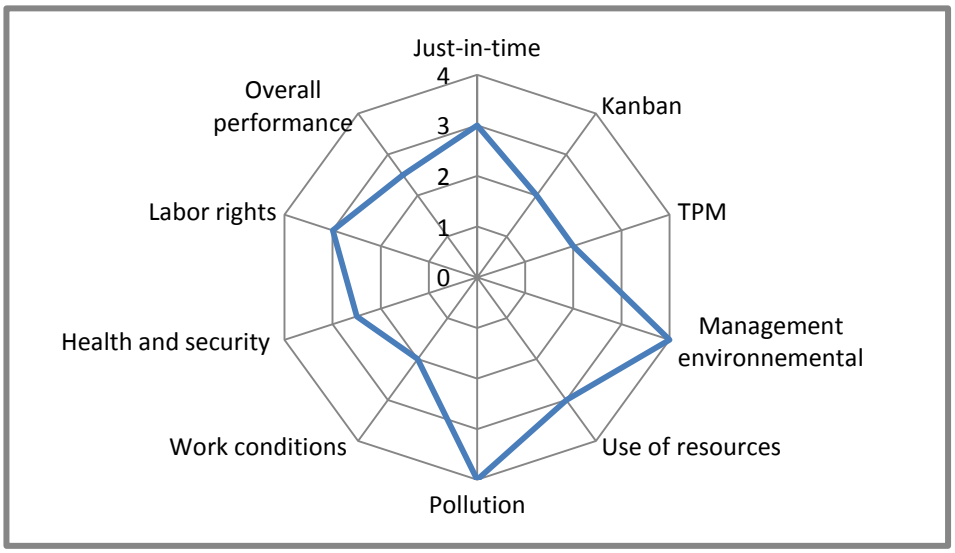

Figure 3: Impact of environmental practices on firm's overall performance (Firm 6)

4.4. Social practices and firm's overall performance
Improved social performance stimulates customers' positive perception of the company's image [17], which will then translate into a sales increase. Social practices have a significant positive impact on overall performance of company. By providing various forms of support for stakeholders of employees, customers, business partners, and the community, the firm's social reputation and number of social awards improve significantly. The result is consistent Employee rights and safety protection are positively related to firm economic performance through the mechanism of corporate reputation [18]. From a more comprehensive perspective, the result of this study supports other study, who found a positive relationship between CSR activities and economic performance [19,20].
Correlation between social practices and overall performance is high, which indicates that firms can largely achieve sustainability from the implementation of social practices.

Outcome 5: Social practices are positively related to firm's overall performance.
Outcome 6: Social practices only have less positive impact on firm's overall performance compared with integrated LES practices (Figures 1 & 4).

4.5. Synergistic effect of LES practices two by two on firm's overall performance
Numerous researchers have attempted to take lean and environmental practices collectively to study their effects on various aspects of firm performance [12]. Lean and environmental practices facilitate each other in

certain ways [12] and jointly contribute to a better competitive advantage and profitability [16]. This fact is confirmed by our results. From case studies, we found that the correlation between lean and environmental combination and overall performance of firm is high, indicating that the simultaneous implementation of lean and environmental practices by firms is an important way to pursue sustainability. As a result, if a firm is implementing lean practices, it would be better for it to also include environmental practices to achieve higher overall performance (Firm 2) (Figures 2 & 5).

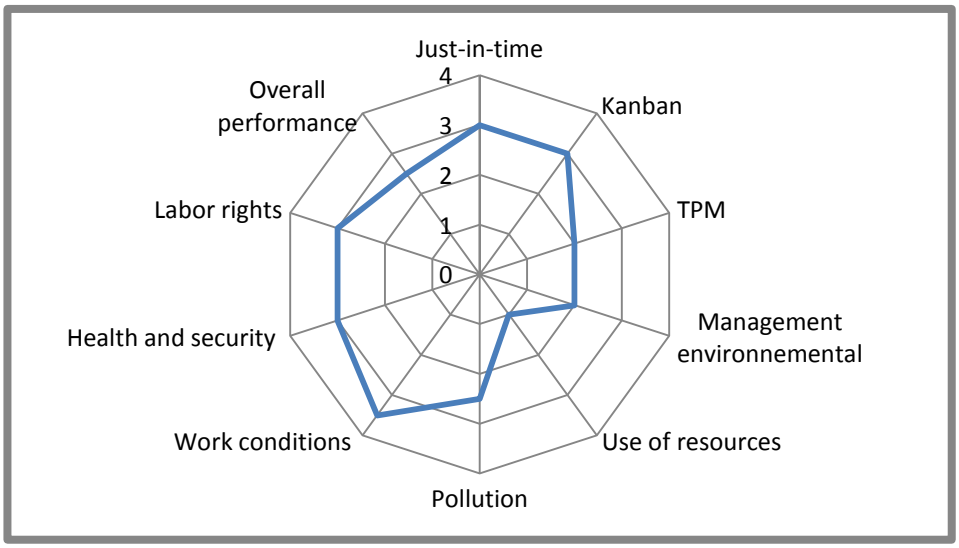

Figure 4: Impact of social practices on firm's overall performance (Firm 7)

Environmental and social practices have long been regarded as sustainable business initiatives by researchers. This study shows that environmental and social practices collectively are highly correlated with overall performance (Firm 5) (Figures 3 & 5). Since the environment is part of CSR, environmental and social practices are closely related to each other. For instance, when a company makes efforts to minimize the negative environmental impact, the stakeholders benefit.
As the results show, a combination of lean and social practices significantly relates to enhanced overall performance (Firm 3) (Figures 2, & 5).

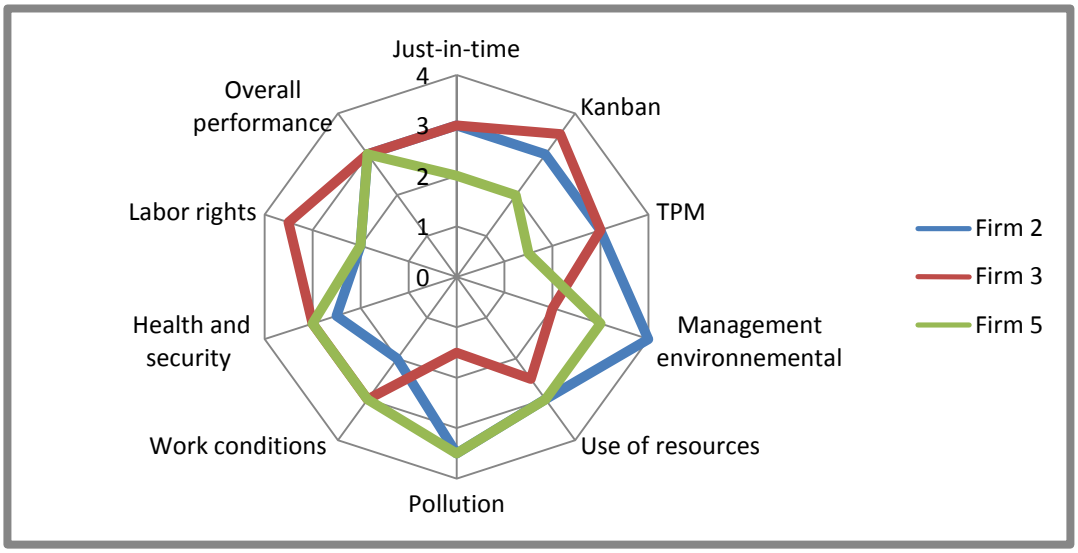

Figure 5: Impact of LES practices two by two on firm's overall performance (Firm 2,3 & 5)

Outcome 7: Any two of LES practices impact positively the firm's overall performance.
Outcome 8: Any two of LES practices has less positive impact on firm's overall performance compared with LES practices together.

4.6. The role of firm size and age in sustainability development

From the results, it appears that category of companies F1 has the highest level of LES implementation and Consequently the highest overall performance, followed by category F2 then F3 (Figire 6). It is worth noting that this order is exactly the same as the order of company size (measured by the number of employees) and firm age. This result is consistent with Shah and Ward [21], who found empirically that firm age and size are important factors in Lean, environmental and social and social practices implementation. The same is true in a sustainability context. According to the respondents of category F1, these companies will continue to increase its coverage and depth of environmental and social practices as it grows because it needs to pay back the society after getting various resources from it. category F2 and f3 have less contentment about environmental and social practices. Like Lean, environmental and social practices are also a never-ending journey which grows with the company.

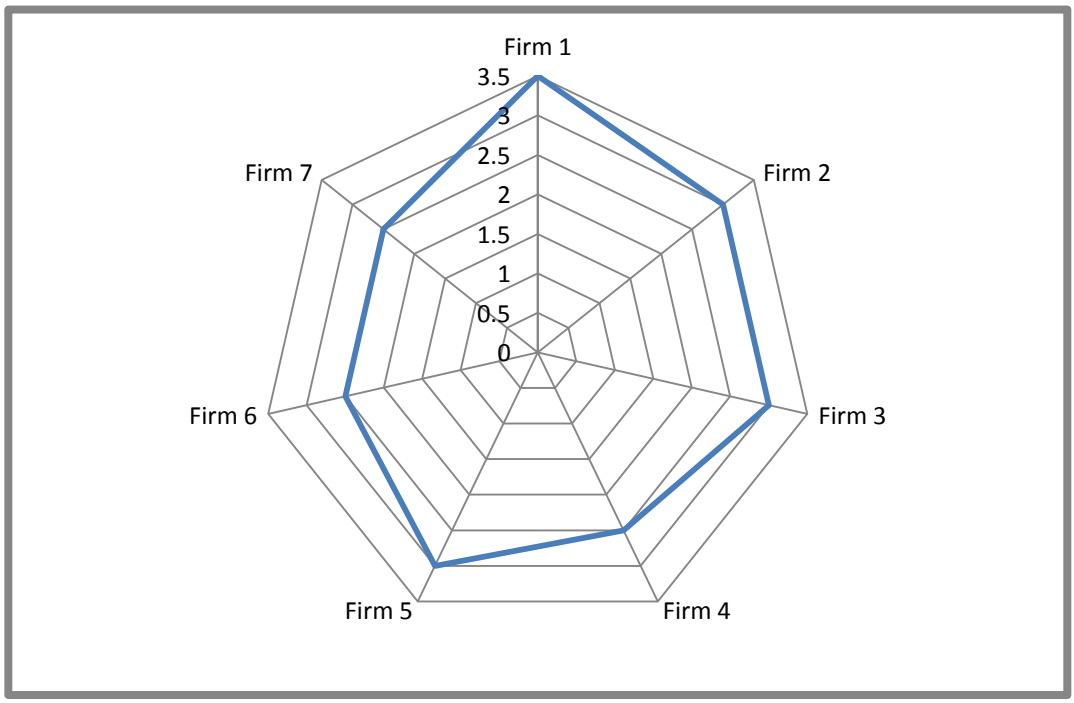

Figure 6: comparison between all firm's overall performances

Conclusion

Each company is constantly seeking optimal medium which increases its overall performance.As in this study, many researchers confirmed the importance of LES practices on overall performance of firm.From the sustainability side, there is a need to take these practices collectively into account to form a more comprehensive frame. Each one or two of LES practices has a significantly positive effect on firm's overall performance; though, the best overall performance can be achieved from a harmonious combination of these three practices. Besides, firm size and age influence the level of implementation of LES practices as well as their performance outcomes. The results of this study will help leaders to integrate the best practices from each category to realize a high level of overall performance in their firms as well as convince various stakeholders.

Appendix A

LES Practices implementation	
TPM	▪ breakdowns ▪ Change of series and adjustment ▪ Change of worn tools or consumables ▪ start-up ▪ Speed reduction ▪ Micro-stops ▪ Waste and scrap ▪ Scheduled maintenance ▪ Wait ▪ Operator movement ▪ Non-balancing ▪ Lack of autonomation ▪ Measurement and regulation for quality ▪ Energy ▪ Materials ▪ Tools

Refernces

1. Zhu Q., Sarkis J., Lai K., Institutional-Based Antecedents and Performance Outcomes of Internal and External Green Supply Chain Management Practices. *J. Purch. Supply Manag.* 19 (2013) 106–117.
2. Gotschol A., Giovanni P.D., Vinzi V.E., Is Environmental Management an Economically Sustainable Business, *J. Environ. Manag.* 144 (2014) 73–82.
3. Gonzalez P., Sarkis, J., Adenso-Diaz, B. Environmental Management System Certification and Its Influence on Corporate Practices—Evidence From the Automotive Industry. *Int. J. Oper. Prod. Manag.* 28 (2008) 1021–1041.
4. Yang, M.G.; Hong, P.; Modi, S.B. Impact of Lean Manufacturing and Environmental Management on Business Performance: An Empirical Study of Manufacturing Firms. *Int. J. Prod. Econ.* 129 (2011) 251–261.
5. López-Gamero M.D., Molina-Azorín J.F., Claver-Cortés E., The Whole Relationship between Environmental Variables and Firm Performance: Competitive Advantage and Firm Resources as Mediator Variables. *J. Environ. Manag.* 90 (2009) 3110–3121.
6. Pullman M.E., Maloni M.J., Carter C.R., Food for Thought: Social versus Environmental Sustainability Practices and Performance Outcomes. *J. Supply Chain Manag.* 45 (2009) 38–54.
7. Lioui A., Sharma Z., Environmental Corporate Social Responsibility and Financial Performance: Disentangling Direct and Indirect Effects. *Ecol. Econ.* 78 (2012) 100–111.
8. Wagner M., Blom, J., The Reciprocal and Non-Linear Relationship of Sustainability and Financial Performance. *Bus. Ethics Eur. Rev.* 20 (2011) 418–432.
9. Zeng S.X., Meng X.H., Yin H.T., Tam C.M., Sun L., Impact of Cleaner Production on Business Performance. *J. Clean. Prod.* 18 (2010) 975–983.
10. Hajmohammad S., Vachon S., Klassen R.D., Gavronski I., Lean Management and Supply Management: Their Role in Green Practices and Performance. *J. Clean. Prod.* 39 (2013) 312–320.

11. King A.A., Lenox M.J., Lean and Green, An Empirical Examination of the Relationship between Lean Production and Environmental Performance. *Prod. Oper. Manag.* 10 (2001) 244–256.
12. Dües C.M., Tan K.H., Lim M., Green as the New Lean: How to Use Lean Practices as a Catalyst to Greening Your Supply Chain. *J. Clean. Prod.* 40 (2013) 93–100.
13. Martínez-Jurado P.J., Moyano-Fuentes J., Lean Management, Supply Chain Management and Sustainability: A Literature Review. *J. Clean. Prod.* 85 (2013) 134–150.
14. Sarkis J., Helms M.M., Hervani A.A., Reverse Logistics and Social Sustainability. Corp.Soc. Responsib. Environ. Manag. 17 (2010) 337–354.
15. Shafiq A., Klassen R.D., Johnson F., Awaysheh A., Socially Responsible Practices: An Exploratory Study on Scale Development Using Stakeholder Theory. *Decis. Sci.* 45 (2014) 683–716.
16. Cusumano M.A., The Limits of Lean. *Sloan Manag. Rev.* 35 (1994) 27–33.
17. Jeong E., Jang S., Day J., Ha S., The Impact of Eco-Friendly Practices on Green Image and Customer Attitude: An Investigation in a Café Setting. *Int. J. Hosp. Manag.* 41 (2014) 10–20.
18. Lee P.K.C., Lau A.K.W., Cheng T.C.E., Employee Rights Protection and Financial Performance. *J. Bus. Res.* 66 (2013) 1861–1869.
19. Saeidi S.P., Sofiana S., Saeidi P., Saeidi, S.P.,Saaeid S.A., How Does Corporate Social Responsibility Contribute to Firm Financial Performance, The Mediating Role of Competitive Advantage, Reputation and Customer Satisfaction. *J. Bus. Res.* 68 (2014) 341–350.
20. Lin C.H., Yang H.L., Liou D.Y., The Impact of Corporate Social Responsibility on Financial Performance: Evidence from Business in Taiwan. *Technol. Soc.* 31 (2009) 56–63.
21. Shah R., Ward P.T., Lean Manufacturing: Context, Practice Bundles, and Performance. *J. Oper. Manag.* 21 (2003) 129–149.