International Journal of Innovative Technology and Exploring Engineering (IJITEE)
ISSN: 2278-3075 (Online), Volume-9 Issue-3, January 2020

Self-Valuation Tool of Maturity Lean for Moroccan Companies

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Abstract: ***The overall objective of this research study is to map the Lean initiatives in Moroccan companies. Understanding in place in terms of Lean tools and continuous improvement project. Identify adaptations and adjustments necessary for the implementation of the Lean approach taking into account local specificities relating to culture, history, geography and the technical and organizational aspects. In this context, we present a state of the art on earlier research dealt with productivity issues, from war on waste and implementation process of continuous improvement and operational excellence in Moroccan companies.***

Keywords: word Lean, continuous improvement, operational excellence, maturity Lean SMEs

I. INTRODUCTION

We should point out that only few studies have focused on the assessment and documentation of Lean management of integration projects in Moroccan companies. However, several indications suggest that the Lean Management approach develops. First, the consulting firm McKinsey implants "INMAA" in our country in collaboration with the Moroccan government, experience shows that Moroccan companies are increasingly interested in further deployment of Lean. Second, many Lean experts assist companies in the implementation of Lean. Finally, many production managers who receive training in Lean Management (More than 240 companies have benefited from the program "INMAA" since its launch, operating in various sectors: mechanics and metal, food, chemistry and chemicals, automotive, aerospace, ...). [1] These findings represent an information beam that appears to show a development of Lean practices in Moroccan industrial companies. However, no statistical study to date has been designed to evaluate the maturity of Lean Moroccan companies.

In this context and on the basis of literature let us make a first state of the art of the major contributions on the subject to make a critical analysis and propose new thinking.

Revised Manuscript Received on January 30, 2020.
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In particular, we focus on the main publications related to the business transformation of Moroccan companies according to the Lean procedure. Second, we discuss the Lean management question of maturity. Our goal is to provide a self-Lean maturity assessment tool adapted to the context of Moroccan companies and to assess lean mastery level in Moroccan SMEs

II. BIBLIOGRAPHICAL REVIEW

A. Definition of Lean System

Lean System is a management approach to improving performance based on the elimination of waste. This approach is defined by a variable number of principles, more or less neighbors, according to the authors.

Christian Hohmann defines in his book Lean Management by "Lean is a system to generate the maximum value at the lowest cost and faster this by using the resources just required to provide customers what makes value to their eyes ". [2] Similarly, he said that Lean is a customer satisfaction centered approach based on the involvement of all people with practices and principles. [2] Indeed, Lean is a system that integrates a set of dynamically interacting elements to customer satisfaction (and wider stakeholders) and the assurance of sustainable business prosperity of the company.

B. Review of the key principles of Lean

To describe the Lean system (Womack and Jones) were based their description on five principles: [3]

Principle 1: the value; defining the elements that increase the value of the property from the customer's point of view.

Principle 2: the flux of the value; defining the chain of added value for each product family. The chain of added value shows the sequence of processes from raw materials to final customer, or from the concept of a new product to market launch. Its weakest element is the bottleneck which imposes its effectiveness as the maximum efficiency of the entire value chain. It is therefore essential to visualize the chain of added value to eliminate bottlenecks.

Principle 3: the flow; ensuring the uninterrupted flow of value, Thus, the value must be constantly on the move

Principle 4: pulling the stream; adjusting production to customer's real needs. Moreover, with a pull system, the flow is much faster, allowing it to be more responsive to customer demand. Principle 5: perfection; continuous improvement to eradicate all sources of waste. It is a fact that excellence is never achieved. It is a process of continuous improvement.

Despite the fact that these principles have been used for years, Moroccan companies, unfortunately, do not seem ready to use them. (Shah and Ward), In their studies to assess the impact of Lean on performance define Lean on four principles such as human resources management, management of maintenance, just-in- time management and total quality [4].

The adaptation of the Lean approach in the company belongs to Lean Management. It is a task reserved for the direction that needs to know the principles of Lean Thinking, developing a culture favorable to lean transformation, propose the application of Lean Manufacturing axes and supporting its operation. [5] For this purpose it is necessary to do the following :

- Adapting the Lean Thinking principles to the company in question;
- Reorganizing and plan the strategy of his company;
- Accelerate the flow of materials: waste reduction, standardization and simplification of processes and flows;
- Create the structure of Lean system in one's company;
- Managing human resources to exploit their knowledge and unused creativity: teamwork, empowerment and personal accountability are the key success of Lean;
- Supporting and constantly improving the application of Lean: namely management commitment, Kaizen continuous improvement, total quality, source control, avoidance of waste [6] [7].

C. Lean within Moroccan companies

Business Transformation in the Moroccan companies is not dealt with in the literature. However existing work involves essentially measuring the performance of Lean applied in Moroccan companies.

After a through analysis of thirty publications, we have found that the implementation of Lean in Moroccan companies and especially SMEs are scarce and theoretical concepts are not yet explored. However, the growing attention to this area over the past decade is largely observed.

Research on the implementation of Lean in SMEs is conducted worldwide. Moreover, the subject is still largely emerging within the scientific community [8]

There is an increasingly growing interest in less developed countries, although its implementation is still at an early stage. The main reasons for this are many, including the current economic situation and economic growth [8], infrastructure, government policies, lack of experience, and low maturity improvement.

(Benhrimida and Dekkaki) [9] were inspired by a field work with Lean experts in transformed companies after the having questioned 48 Lean experts and 120 employees from 31 large industrial companies mainly located in Grand Casablanca .

The answers collected by the various Lean operators of the companies have illustrated the perception of Lean and the actions to put in place to overcome resistance to change, and to highlight the perception of Lean within Moroccan companies .

A come-back of experiences. On the patrol experts in transforming the model INMAA Lean Factory settle in the area and Bouskoura ANPME proved very useful for a sample of 30 SMEs [9]

The study showed that the majority of business leaders consider Lean as a toolbox. This erroneous view according to experts, leads to poor understanding of this process in Morocco.

A slight difference in the perception of lean on one hand by the approach of professionals and, on the other hand, by employees of the transformed enterprise. Experts see Lean in an improvement process necessary for the development of the competitiveness of Moroccan industrial companies. According to them, this approach improves operator working conditions. They also emphasize the importance of the resistance to change among employees due to the introduction of a new organizational model and the disruption of its habits. As for employees, they view the introduction of new procedures as additional stress and increased workload.

We should also point out that a lace of management involvement, middle and top management as well as resistance to change and the sustainability of the actions implemented, may be the cause behind the failure of establishing Lean in Morocco. That said, one of the main obstacles to performance has to do with the difficulties in adopting the organizational culture necessary for the implementation of Lean in organizations.

III. THE LEAN MANAGEMENT MATURITY.

Each company sets its strategy to meet the specified objectives. But once the strategy is defined, many organizations face problems in carrying it out. It is, therefore, essential for a company to be able to determine the status of the lean transformation in order to know what has already been accomplished and what remains to be done to complement the lean transformation.

It is typically a maturity problem.

Andersen defines maturity as "the quality or state of becoming mature". [10] For Kerzner, maturity is "linked to the development of systems and repetitive processes that represent a high probability of project success". [11] The measure of maturity can "show the state reached in relation to the state in which the project should be" [12] and so have the information to change / standardize processes.

A maturity level corresponds to achieving a uniform level of fitness for a group process. A level of measurement capability meeting the objectives of a process for the given level. [13]

A. Towards a self assessment tool.

To help Moroccan companies and especially SMEs to characterize the practical reality in terms of the deployment of Lean in organizations and allow to consider the next steps ahead in deployment efforts. We propose to develop a self-assessment tool of Lean maturity drawing an existing tool in the area of health and social services. [14] Higher maturity levels indeed offer a vision of what an organization Lean called mature is.

1) Evaluation of the Lean System

2) To do this, the approach that has been adopted is the development of a questionnaire of self-evaluation of the level of integration of the Lean approach, the evaluation questionnaire based on the use of the method that is IEMSE used in the forms of audits to assess implementation after some time the sustainability of a new solution or a new procedure. This method is often used in the steps of Six Sigma5 to standardize step / sustain (Maurice Pillet, 2004). [15]

The IEMSE method is to answer the question with one of the 5 following responses: [16]

- **I** : Not - This point is not treated within the company
- **E** : Existing - There is a response showing that the company took the point into account
- **M** Method -the Lean Practice is treated in a manner that is likely to be widespread
- **S** : Systematics - The practical aspect is treated with method, and field application is effective and systematic (sustainability over time)
- **E** : Exemplary - The method, its application and its results need to be communicated to the outside because effective, efficient and simple.

A score is assigned to each response. The value of 1 is assigned when the point is not treated within the company (Not present) and the value 5 is given when the application of the method is exemplary. For each practice, we have determined the detailed answers from this method.

Tables 1 and 2 present an evaluation matrix of example produced from this method for five Lean practices.

Tables 1. Evaluation grid for the last 2 lean practices

Management commitment		
I	***non-existent***	No management commitment to implementing Lean practices
E	***Existing***	Management is interested in Lean but certainly the application of this approach in its business
M	***Method***	Management has a good knowledge of the Lean approach, but has not implemented comprehensive approach
S	***Systematic***	Management is trained in Lean, identified a person in charge of the implementation of the approach
E	***exemplary***	Management is trained in Lean, identified a person in charge of the implementation of the process and actively participates in actions
standards		
I	***non-existent***	There is no or little standardized procedures (step by step, organizational charts, job descriptions ...)
E	***Existing***	Some activities are normalized
M	***Method***	Standards are developed by all staff, some standards are not updated
S	***Systematic***	Standards are developed and regularly updated by the company's staff
E	***exemplary***	Standards are updated regularly, regular internal audits are developed to check deviations to standards, standards are used for training
Device error proofing or poka-yoke		
I	***non-existent***	No mistake proofing device exists
E	***Existing***	Training is conducted to explain the interest of Poka-Yoke
M	***Method***	The company sometimes uses this device to improve self-control
S	***Systematic***	The company often uses the anti-error devices
E	***exemplary***	The Poka-Yoke are commonly used

Tables 1.Evaluation grid for the first 3 Lean practices

chain mapping value		
I	***non-existent***	No flow analysis is performed
E	***Existing***	Flows are sometimes analyzed (eg a new product)
M	***Method***	The flows are analyzed using a standard when hinder the company's performance
S	***Systematic***	value chain mappings are implemented, an action plan is being implemented
E	***exemplary***	value chain mappings are implemented, actions are taken regularly to reduce non-creative value-added operations
problem solving practice		
I	***non-existent***	No root cause analysis. The company only deals with the symptoms of problems
E	***Existing***	A standard exists to deal with the root causes of problems, this standard is not applied
M	***Method***	A standard exists to deal with the root causes of problems, this standard is often applied

S	***Systematic***	A standard exists to deal with the root causes of problems, this standard is often applied and regular training are in place
E	***exemplary***	A standard exists to deal with the root causes of problems, this standard is always applied, internal and external audits are implemented

3) Lean maturity level companies

The tool presented evaluates the maturity, ownership and deployment of the Lean approach through three main areas of transformation that have emerged from research and empirical validations in the development of the tool:

First: consistency, it will assess the alignment of actions and decisions on the expanded strategic vision and the clarity of vision that is communicated in the organization.

Second: the capability, it will assess to what extent the company is in control of tools, techniques and practices related to Lean.

Third: involvement, it will evaluate the depth of the cultural roots of Lean culture in the institution.

The assessment questionnaire is based on the judgment of one to five levels of responding to the question with one of the following 5 levels:

Level 1: Stirring Some knowledge of this practice; Lean or Lean tools practices can be implemented.

Level 2: Recognition, General awareness; Informal approach deployed in some areas with varying degrees of efficiency and maintenance.

level 3 : Integration, systematic approach / methodology deployed at various stages in most areas.

level 4: Generalization, continuous Development and continuous improvement of the business; The earnings improvement are supported.

level 5: Excellence, Exceptional approach, well defined and innovative fully extended in the extended enterprise (through flow internal and external value); recognized as best practice.

The final level implies that lean principles are now an organizational reflex not only in the organization of practices, but also in the appropriation of expected behaviors.

4) How the maturity of Lean is determined in these companies:

A score is assigned to each response. The value of 1 is assigned when there is some knowledge of this practice within the company and the value 5 is assigned when the application of the method is exemplary. Then, the average that the company calculated is obtained by scanning the 29 entries (each entry corresponds to an organizational component).

The mark that gives the company a rating of 5, to accurately determine the company's level of maturity in question. This is the sum of the scores of each entry in twenty nine (we have chosen 29 in a first time).

The subtotal of each section is an overview of Lean maturity level.

The lower scores (closest Level 1) therefore represent challenges or elements that should be prioritized for growth in terms of Lean maturity. Therefore, it will be possible to structure future interventions targeting actions in the components that seem to require more intervention.

The highest scores are the strengths and could well serve as valuation elements for the employees.

An evaluation matrix of example produced from this method for five Lean practices:

Strategic planning processes:

- Q1: The concepts and benefits of basic principles and practices of Lean are not evident in the culture or business plans.
- Q2: Lean is recognized, but relegated to lower levels of the company and the application is fragmented.
- Q3: The implications of the growth of Lean are understood and implemented. Lean development plans are formulated, but not integrated into the strategic plan.
- Q4: Transition to Lean economy is adopted as a key strategy of the company and included in the strategic plan.
- Q5: Strategic plans build on the results of implementing Lean to achieve growth, profitability and market position

Focus on customer value:

- Q1: The way to set the value for the (s) client (s) is informal and unstructured.
- Q2: Structured process to set the value and applied to the selected clients.
- Q3: How the company can best contribute to customer success is well defined and integrated into most projects / programs.
- Q4: The definition of value by the customer strongly influences the strategic direction.
- Q5: The competitiveness is enhanced because customer value becomes the predominant driving force throughout the extended enterprise.

Commitment from senior management

- Q1: The level of commitment from senior management and direction is variable - some don while others may actively resist.
- Q2: Senior management buys the group's commitment; Executives who can not or will not adapt are replaced.
- Q3: The "Lean" is an integral part of corporate meetings, meetings of senior officials, etc. The executives personally and visibly govern the conduct of the transition to Lean.
- Q4: Senior leaders defend the transformation to look within the company.
- Q5: Senior Leaders encourage the implementation of Lean.

The vision of Lean within the business

- Q1: Senior leaders have various visions of Lean, of any out-set.
- Q2: Senior leaders adopt a common vision of Lean.
- Q3: Lean vision was communicated and understood by most employees
- Q4: The shared vision of Lean is shared by the extended enterprise.

- Q5: Stakeholders Lean internalized the vision and actively participate in its realization.

The flow of material and information:

- Q1: The flow of materials and information are disjointed and "optimized" by process. The mentality of "push" prevails
- Q2: Some primary flow paths have been revised to overcome the major obstacles to the flow.
- Q3: primary flow paths are simplified and aligned with the values or flows, which allows the material to flow as needed.
- Q4: The material and information flow seamlessly throughout the enterprise.
- Q5: The material and information flows seamlessly and in all responsiveness across the extended enterprise.

IV. CONCLUSION

In this article, we focus on operational transformation of Moroccan companies and Lean Management.
First, we focused on the Lean concept. It aims to optimize and improve performance through action on the sources of waste and inefficiency of business processes, while respecting a set of fundamental principles and using a variety of preset tools.
Second, we discussed the question of maturity Lean management. Thus, A Lean organization is called "mature" when it has organizational elements giving it the opportunity to invest beyond the single improvement projects while engaging in a cultural transformation within which the continuous improvement and efficient conflict resolution are put forward. This is possible through the enhancement of the participation of employees in the field.
We also presented a tool for self-assessment of the maturity Lean adapted to the context of Moroccan companies that would allow us to assess lean mastery level in Moroccan SMEs
Using this tool, Moroccan companies are preparing to undertake a major reflective process and to achieve good progress in the deployment of Lean in their organization.
That's why we want to develop further this tool and make it more accessible in terms of computer format (in Android).
Looking ahead, we intend to use our tool in some Moroccan companies to obtain feedback to as to develop this tool.

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