Adaptability of new production practices trends in emerging markets of Latin America

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Abstract
Constant progress of R&D&I help creating new production practices that are standardized and profitable for world-class industries. Nevertheless, these practices must consider contingent elements of adaptation for emerging industries. In this context, this paper studies the latest trends of these practices and adaptability of emerging markets in Latin America.

Keywords: production practices, emerging industries, adaptability, Latin American markets

Introduction
Due to the external forces such globalization results and the need of joining effort to develop the emerging countries, the academy with the support of research institute take on the challenge to produce new researches that permit companies and countries to be more competitive. In this meaning, the present research focuses on the analysis of world class manufacturing practices available and its implementation in Latin America in order to know if they are adaptable to environment and to encourage the competitiveness and the participation on the international markets. This research offers an overview of the last trend of world class manufacturing in Latin America and their adaptability.

Nowadays, with the financial crisis and global recession, the local economies find difficult to expand and require manufacturing standards that allow been at big corporations level, which invest every year in developing new processes that over time become practical world class manufacturing. Nonetheless, these practices are reserved for biggest companies and not for companies belonging to emerging market and developing countries, because the implementation and their applicability involves burdensome cost, physical and technological resources that even with the advances of technology access continue lags behind. Besides that, the efforts made by independent companies have helped manage process of adaptability of world class manufacturing practices in order to offer products with international quality standards. This has led emerging companies to seek the possibility of study their environment variables and adapt practices that are the best acceptable for the organization, impacting directly on export growth and profitability. Therefore, is it important for this research inquires, what are the environment variables that every organization should consider to search the adaptability of world class manufacturing practices?
World Class Production Practices
Across time, the world class companies’ pursuit the improvement of their process, adding new and effective procedures. Actually, these practices are considered only for the big companies because they are have the necessary resources to implement in their organization. The basic characteristics of world class companies are focus in three principles (ABHINAV, 2013); 1) the first is what is known as Just in Time or Lean Manufacturing, the step by step elimination of waste. Waste in this sense is defined as any activity that adds cost but not value to the end product such as excess production, stock, idle work in progress, unnecessary movement and scrap, 2) the second is Total quality, a culture of intolerance to defects both in the processes and also information such as bills of material and stock records. Total quality is often these days called Six Sigma which uses total quality and lean manufacturing techniques to attempt to reduce rejects to 3.4 per million parts produced, 3) the final principle is the principle of Total Preventative Maintenance where, whenever practical, a preventative maintenance program means that unplanned stoppages due to equipment failure are minimized.

The most known in the words class manufacturing practices are:

1. Make-to-order/JIT Manufacturing
2. Small lot sizes
3. Families of parts
4. Doing it right the first time
5. Cellular manufacturing
6. Poka-yoke
7. 5 – S
8. 6 – Sigma
9. Total Quality Management (TQM)
10. Total preventive maintenance (TPM)
11. Quick changeover/Single Minute Exchange of Dies (SMED)
12. Zero Defects
13. Just-in-time (JIT)
14. High employee involvement
15. Cross functional teams
16. Multi-skilled employees
17. Visual signaling
18. Statistical process control (SPC)
19. Lead-Time Reduction through Streamlined Flows of Information and Products;
20. Policy Deployment, HR Management and Best Practice for Staff Motivation;
21. Continuous Improvement of Customer Service
22. Lean Thinking;
23. Attractive Quality Creation;
24. Levelled Production System;
25. Variable-Product Variable-Quantity Production to meet Demand Fluctuation;
26. Synchronized Production System (from order to delivery);

Although each of these practices can be applied to any business model, it’s important to identify that not all are developed to apply fully in certain markets, are applicable only if the characteristics of the organization fit to biggest corporations that have developed, added the capabilities of emerging markets and developing countries to make a benchmark with first class countries. Even though, production practices are standard for any industry, but their applicability and implementation requirements is not available to any organization, limiting them to world class corporations (Swamidass, 2000). Nevertheless, globalization and competitiveness requires industries to select world standards in their processes to compete in world markets. At this point there are many limited industries, that even by having good quality products; they are unable to compete in world markets because of their manufacturing standards.
The implementation of these manufacturing standards is not only about to consider new changes in shop floor processes, it is actually needed to take in control a series of preceding activities such as management of raw materials, equipment and tools, quality control, maintenance, planning, sufficient financial resources, modern technological systems, training resources, organizational restructuring, shiftless time for implementation, work philosophies, to enroll the organization to practices of this type (Schonberger, 1986). New trends in the practical applicability of manufacturing world class, has been complemented with the absorption of capital flows as a result of economic change, allowing the region to increase its participation in world market through exports (CEPAL, 2013 ). Therefore, this paper present the analysis of Growth and Diversification of Exports in Emerging Economies Report conducted by CEPAL (Table 1), in which analyzes the countries of Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Bolivarian Republic of Venezuela, Dominican Republic and Uruguay, in Asia, Bangladesh, China, Philippines, Hong Kong (SAR), India, Indonesia, Malaysia, South Korea, Thailand and Vietnam, making known their annual variations GPD and exports of goods and services, demonstrating the increased competition from the continuous improvement of the labor practices of implementing world class manufacturing.

<table>
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<th>Table 1 - Growth of Latin American &amp; Caribbean GDP and Asia</th>
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<td>GDP</td>
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<td>Rate of growth</td>
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<td>Latin American &amp; Caribbean</td>
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<td>Relation between GDP and the elasticity of exports</td>
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<td>Latin American &amp; Caribbean</td>
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At the same time, foreign direct investment has focused its resources in countries of Latin America, which lead to make an offer of highly competitive productions, whose sustainability rests on the applicability of world class manufacturing processes. For this, describe flows derived therefrom (figure 1).
In addition to, the figure 2, shows growth of exports of firms that export directly and indirectly and represent a significant growth, they don’t exceed European and East Asian. However, evidencing the way towards competitiveness in a short period (CEPAL, 2013).

![Figure 2](image1.png)

*Figure 2- Companies that exports in direct and indirect way, by size, per region, 2009-10, CEPAL, 2013.*

The foregoing invites public and private entities to gestate organizations with solid production and organizational structures, although their economic natures, these organizations in Latin America are structured as follows:

![Figure 3](image2.png)

*Figure 3- Typical industrial organization in developing countries, CEPAL, 2013.*

A difference of developing countries, developed countries have an organizational structure that increases the production of RD&I and implementation of new processes accompanied by world class manufacturing.

![Figure 4](image3.png)

*Figure 4- Typical industrial organization in developed countries, CEPAL, 2013*
The previous leads demonstrate how big capital flows are moving to Latin America, and also show the competitiveness and growth that are having the emerging markets, logistics location of Latin America and other macro-economic factors, force to the economies of Latin America starting to strengthened through the implementation of world-class manufacturing processes to compete with world powers countries (Swamidass, 2000), but this should give context their environment so they can adapt world class manufacturing practices for each region, country and organization.

**Last Trends and Adaptability of World Class Manufacturing Practices in Latin America**

The last trends in world class manufacturing practice are defined like all improvement development and value adding to the original practices. Elements such technological advance, improvement in communication, complementary improvement to the most used practices like Lean Manufacturing and JIT, way to planning in crisis time, advances in logistic, etc, invited all big companies to focus their strength and source to created new process that permit the better use of available resources (figure 5). However, in a globalized world, these new development trends for big companies also are could be reply for other companies to want to competitive in the international markets, this meaning, opening the studies for adapt all new theory to everybody. The emerging economies are not the exception, because the need to expand and grow to first world markets, try to find mechanisms of convergence between practices and environment to benchmark and make the organization competitive.

![Figure 5- Continuous Improvement & Innovation best practices assessment, Ross A., 2013.](image)

Furthermore, the stayed above aspects, are driven by the economic crisis in the world power countries, capital leak in industrialized countries to emerging countries. Globalization required to the biggest corporations in Latin America (in emerging and developing countries), to implement new manufacturing practices so they can become more competitive and participate on equal terms with the world powers in international markets efficiently (Pascual, 1999). This has led to create continuous improvements and new trends that take form on the organizations that are demanding to compete in international markets and have a return that allows expanding and growing consideration, that are shown below (Bjørge Timenes Laugen, 2005).

1. Smart automation
2. Improved manufacturing precision
3. Lightweight material
4. Advance sensing
5. Robotic
6. Innovation in supply chain
7. Engaging communities
8. Sustainable = efficient = more profitable
9. Dealing with market volatility
10. simulated manufacturing
11. Recycling manufacturing processes
12. Energy Efficiency and Production
13. 3D Printing manufacturing
14. Formation of specialized human capital
15. Overcome lacks of skilled labor
16. Tech machinery
17. Sustainable Green Manufacturing
18. Continuous improvement processes
19. international certifications
20. Generation of Electronics
21. Implementation of the latest trends in manufacturing practices
22. Recruitment of foreign labor
23. Flexible electronics
24. Flexible Manufacturing Implemented
25. Improvement the changeability of manufacturing
26. Improvement of Overall Manufacturing Capability
27. Acceptance and support of sustainable manufacturing
28. Effort to increase the level of R&D investment in science and technology
29. Technology choice

As well, it’s important to contextualize the degree application of world-class manufacturing practices of companies through the following graph.

![Graph: Five Items of Competitiveness Management](image)

*Figure 6- Five Items of Competitiveness Management, Schroeder, R., Flynn, 2001*

**Result**
Assuming that the volatility of the markets and the broad participation opportunities that are offer by globalization, economic and financial crisis in the world, commended emerging economies and developing countries, leading to perform a benchmarking of their industries and world class manufacturing practices application (Fossey, 2014). However, they require a socio-economic variables analysis, which has to take place when they start to implement new processes in their factories, because their standards, competitiveness, efficiency and effectiveness references are lower than highly competitive global market, reasons that make doubly complicated the insertion of new practices to improve their competitiveness (Shipp, 2012). In this meaning, this research presents a set of variables to consider when comes time to adapt these practices on environment emerging economies and developing countries.
From the literature review, one way to promote the adaptability of these practices, and based on the external balance of market forces, as well as those macro-economic aspects, consist in develop a theoretical model to identify schematically principals environment variables that could make approach for adaptability of world class manufacturing practices to any organization of Latin America. For this reason, below present a set of variables that have to be analyzed after the implementation of new world class manufacturing practices’ trends.

Figure 7. Adaptability Model proposed

These variables will create a contextual diagnosis to the organization before making an investment; it will also help them to define the practices and changes that are needed in order to become highly competitive in the national and worldwide sector. In addition, this study is necessary for setting comprehensive measurement of additional sectors and subsectors, and also
to determine and improve its position on the market (Monden, 2008). The model is based on three priority areas (shop floor, management of company and business) where converging variables displayed. In this way presented the adaptability model.

The trends that were previously mention give the opportunity to create spaces of adaptability to market requirements, make appropriate benchmarking, encourage innovation and continuous improvement of world class manufacturing practices, in order to be part of competitive process and to strengthened the possibility of that emerging economies can actively participate in global markets. Among the countries that are leading the way in growth and venture into the elements under consideration are: Mexico, Brazil, Argentina, Chile, Colombia, Costa Rica, Ecuador, Chile, Peru, Guatemala, El Salvador, Honduras, Nicaragua, Panama, Paraguay, El Salvador, Uruguay, Venezuela and the Dominican Republic, this stimulated for growth of private sector credit, an improvement in the labor market, etc. (CEPAL, 2013).

Conclusion
Emerging markets need to strengthen their production processes through the implementation of practices of world class manufacturing over prior analysis environment that facilitates adaptability with profitable results for the organization, leading to competitiveness and increase the participation in world markets.

Developers of global manufacturing standards need to identify environment variables on each region, in which manner theories, models and practices can be replicated at all scales or business models, this will expand the sector whose transformation processes of matter are made with the highest quality standards, without being located in industrialized countries. This will give the possibility to improve competitive, flexibility, innovation, quality, efficiency, decrease cost and increase cohesion labor.

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