1   Introduction

Today, in times which Industry 4.0 (I4.0) technologies are dominating trends, there are many software solutions at the market that promotes to digitally transform systems and its processes. Manufacturing Execution Systems (MES) are considered backbone of the "Smart Industry" [1], aiming reactive detailed planning, enabling companies to quickly respond to events occurring in the production process, taking a granular view on production data, and addressing functions and tasks between the Enterprise Resource Planning (ERP), i.e. the management level, and the equipment automation level [2, 3]. Because the MES is such an all-encompassing system, its implementation involves balance the interests of stakeholders from across the company. Even the most agile manufacturers will need to spend months reviewing the scope of their MES needs [4]. For decades, software (legacy nowadays) was developed and delivered in lockstep processes and did not allow for flexibility. Today it is difficult to manage the production operations in an industry without the use of flexible computer systems, once the core value of the business is being delivered through software [6]. Acknowledging the difficulties of MES implementation, meantime, understanding the importance of its functions in the level of automation, our studies presents a perception of how those functions can be achieved in the industry.

2   Objectives and Methods

This research investigates how MES level features (i.e. ISA-95 Levels 3 to 4) are being exploited in the manufacture industry, and it was envisioned by a necessity to digitally transform a legacy system inside a multinational car company. Therefore, we grasped to understand the gap between how literature and market solutions address such systems, giving us the possibility to generate a hypothesis on how to approach modern MES solutions. With this in mind, our literature review was performed by searching articles with the string: (Manufacturing Execution Systems OR Manufacturing Operation Management) and (implementation OR industry 4.0 OR applied OR definition); 2011 onwards. Couple with that, retail MES providers were interviewed, giving us margin to understand those systems in the market view.

3   Results

Literature suggests that, in one hand, the success of MES relies upon integrating data from various aspects of the manufacturing process. In the other, the total cost for a feature consists of design, implementation, test, and deployment costs, as well as the costs to fix defects or other maintenance work over its lifetime. Furthermore, we expose finds on the gap between the requirements supported by modern MES and those proposed by the ISA-95/ ISA-88 [5]. It was also possible to comprehend the differences between MES vs Manufacturing Operation Management (MOM), and how this second

nomenclature extend the functionality of the first to cover the whole manufacturing process in an area [1]. Furthermore, it is understood that the pyramid defined by the ANSI/ISA-95 entity, conceived in Industry 3.0 Era, will undergo significant changes [7]. This is due to the fact that Industry 4.0 promotes economic impact as it envisions a substantial increase in operational effectiveness along with the development of entirely new business models, services and products [5]. Industrial software vendors are striving to build MES4.0 features (in the light of I4.0), by rapidly updating changes that, sometimes, overlapping functionality of a wide variety of systems. Finely, our perception brings us to an short/long term strategic view: in the long run, complete modern MES solution are essential to achieve the holistic view of an digital-driven factory, its cost and time investments are justified in two to three years; in the short run, because software systems/subsystems are constantly being improved by its developers to suit the industry need of punctual necessities, out-of-the-box solutions can be found in already implemented software tools (outside MES level), e.g. some office BI tools could generate real time shop floor data without touching the MES.

4 Conclusion

This article presented a literature review of modern concepts of MES/MOM, and how its market solutions are being delivered to the manufacturing industry nowadays when information and communication technologies (ICTs) and its software are crucial to enable smart factories, playing a key role in Industry 4.0 [8]. Our results gave us the perception to better understand MES level software solutions nowadays and its importance to enable fully digital factories in the competitive panorama faced by manufacture industries when they search for improvement.

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