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SMART MANUFACTURING: THE MANUFACTURING STRATEGY AND AFFORDANCES PERCEPTION INFLUENCY

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Purpose of the paper

Industry 4.0 has become a very common term in recent discussions about the industry. It was originated in the Industrie 4.0 German program, which aims to strengthen their national industrial park competitiveness using new information and communication technologies to the manufacturing. Similar initiatives were created in different countries, such as the American Industrial Internet of Things. The Banco Nacional de Desenvolvimento Econômico e Social (BNDES) and the Empresa Brasileira de Pesquisa e Inovação Industrial (EMBRAPII) are conducting in Brazil technology research incentive program, with the name Manufatura Avançada (Smart Manufacturing).

In all these initiatives, concepts like integrated supply chains and Cyber-Physical Production Systems (CPPS), can be found with the same expectations of great improvements in production flexibility, quality, and efficiency.

The information systems management and operations management researchers say that the relationship between technology adoption and business impacts indirect and complex.

The operations management literature shows that the adopted technologies have to be aligned with the competitive priorities and the company production model to generate the expected impact. Thereby generic system adoption recommendations are not possible, only taking account the company segment and its attended market. The application of technologies that have emerged outside the industrial environment and are not familiar with the technology teams of that environment is another important factor. If the utilization context of the technological artifact changes, their capabilities became different.

The term affordance, in the technology sociology, is an agent action possibility when in touch of a specific object. In the Smart Manufacturing context, the technologies affordance perception, that shapes their applications, will require new knowledge, present in different departments today.

This work aims to contextualize the Smart Manufacturing with the previous integration system models, and do an empirical study integrating the Operations Strategy and Affordance theories,

Related work

This paper integrated the recent Smart Manufacturing (Bartodziej, 2017; Toro, Barandiaran, & Posada, 2015)literature with the manufacturing strategy (Choudhari, Adil, & Ananthakumar, 2010; Kathuria & Igbaria, 1997) and affordances (Hutchby, 2001; Pozzi, Pigni, & Vitari, 2014).

Design/Methodology/Approach

Based on the affordance and operations strategy theories, this work applies a framework as a starting point for case studies conduction in five projects in three large Brazilian companies. In order to study the impact of different manufacturing strategies on technology adoption, were selected companies from different market segments that represent well the Brazilian industry: sugar and ethanol, electronics assembly, and beverages.

Findings

The field studies could have confirmed that the adopted technologies are influenced by operations strategy and the possible complexity of new technologies applications identification. Besides that, new technologies team configurations was observed for Smart Manufacturing projects and some specific technologies application objectives could be mapped, generating a new revised framework.

Research limitations/implications
Since it is a qualitative research, and the field study limited to Brazilian companies, it offers limited extrapolation possibilities. The proposed framework, on the other hand, can be used in other research designs and methodologies. The combination of the affordances and operations strategy theories possibly can be applied to different technology contexts.

Practical implications
The managerial impact of Smart Manufacturing is one of the main discussion topics in the industrial area today. The contextualization of Smart Manufacturing with more well-known IT systems, like Manufacturing Execution System and Product Lifecycle Systems, can contribute to decades of literature and implementation experiences that can guide future decisions.

Originality/value of the paper
The Smart Manufacturing, and national initiatives like Industry 4.0 and Industrial Internet of Things, are very new topics for the scientific literature and much of the research is about engineering challenges. This paper aims to contribute with the administration and business literature.

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Keywords: Industry 4.0, Industrial Internet of Things, Affordances, Manufacturing Strategy

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