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Implementation of lean production in multinational corporations: A case study of the transfer process from headquarters to subsidiaries

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ABSTRACT

Several multinational corporations are launching multi-plant lean programmes to increase the coordination of dispersed and heterogeneous plants and promote the growth of the organisation as a whole. Such programmes represent an emerging field of research that seeks to understand the most important mechanisms to transfer lean concepts and practices successfully, given the different contextual conditions of a multi-plant network over time. Here we present an in-depth explorative case study to investigate this issue. An analysis of the programme of an Italian-based company to transfer lean to its Chinese and US subsidiaries over approximately four years was used to develop propositions. Proposition 1 indicates that, throughout a programme, headquarters should use international teamwork to perform training, sensegiving and adaptation in foreign subsidiaries. It also underlines the relevance of pressure via teamwork if a subsidiary resists. Proposition 2 suggests to deploy close and lasting teamwork to transfer lean to plants that are autonomous and new to lean. Close but brief teamwork can be used for subsidiaries that are integrated with headquarters and not new to lean. Proposition 3 argues that the presence of a stable group of managers in subsidiaries facilitates interactions with headquarters and knowledge transfer. Proposition 4 underlines that training, sensegiving, adaptation and pressure via secondary mechanisms throughout a programme are necessary to sustain actions via teamwork. The propositions serve as a basis for future research and empirical validation. They also serve as guidelines for managers in charge of multi-plant lean programmes.

1. Introduction

Over the past two decades, several companies have grown internationally by establishing production subsidiaries worldwide, giving rise to multinational corporations (MNCs). As a consequence, managers faced the new challenge of coordinating dispersed and heterogeneous units. A widespread way to deal with differences among plants and manage the MNC as a whole is launching multi-plant improvement programmes (Netland and Aspelund, 2014). Such programmes concern the transfer of operational knowledge among plants and can be defined as 'the systematic process of creating, formalising and diffusing better operational practices in the intra-firm production network' (Netland and Aspelund, 2014; p. 392).

This study focuses on multi-plant lean programmes (or programmes hereafter). Lean production is a method that levers on a complex system of socio-technical practices to enhance manufacturing performance through waste elimination and continuous improvement of production processes (Liker, 2004; Shah and Ward, 2007; Bortolotti et al., 2015). Driven by the success achieved by headquarters, several MNCs have transferred lean knowledge to foreign subsidiaries seeking similar benefits. Apart from Toyota, a few recent examples are Mercedes, Caterpillar, Bosch, Siemens and Volvo (Netland and Aspelund, 2013). This trend is not only confined to medium and large companies, but also small MNCs are transferring lean to their international subsidiaries nowadays (Camuffo, 2014).

However, several programmes encountered significant difficulties, and some even failed (Pay, 2008; Netland and Aspelund, 2014). Such difficulties can be generally attributed to the complexity of lean implementation as well as to dealing with the different subsidiaries' contexts (Maritan and Brush, 2003; Lander and Liker, 2007). As mentioned in Netland and Aspelund's (2014) literature review, little research is available regarding multi-plant improvement programmes. For example, little support is provided for the selection of mechanisms for transferring lean knowledge (transfer mechanisms or mechanisms hereafter). According to

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previous studies (e.g., Ferdows, 2006), both social mechanisms (e.g., social interactions among lean experts of different plants) and standards (e.g., lean knowledge codified in manuals) are generally important for sharing and improving lean practices in MNCs. However, preliminary evidence showed that the effectiveness of such mechanisms can vary during a lean programme because of the absence or presence of specific contextual conditions (Ferdows, 2006; Inkpen, 2008). According to Inkpen (2008) and Dinur et al. (2009), further research should identify which mechanisms are most important according to different contextual conditions as programmes evolve over time. Our study addresses this call and empirically investigates the research question: In a MNC, which are the most important mechanisms to transfer lean knowledge according to the different contextual conditions of the network over time?

It is worth noting that the paper focuses on analysing two main contextual conditions that seem to be crucial: the maturity of lean implementation in a subsidiary and headquarters-subsidiary relations (e.g., Ferdows, 2006). For what concern mechanisms, we considered the differences in the type of mechanisms (Ferdows, 2006; Inkpen, 2008) and in actions performed via such mechanisms (Schein, 2010; Canato et al., 2013).

This paper makes an explorative study to investigate this issue. We use an in-depth case study methodology to examine initiatives implemented by an Italian-based company to transfer lean to its US and Chinese subsidiaries, which occurred over a period of four years.

The paper is structured as follows: Section 2 develops the theoretical foundation, Section 3 describes the research methodology, Section 4 provides a detailed narrative description of the case study, Section 5 discusses insights and proposes research propositions and implications for practitioners. Section 6 discusses the limitations and future research.

2. Literature review

Section 2.1 identifies in the literature which mechanisms can be used to transfer lean knowledge in MNCs. Section 2.2 reviews previous studies to depict which contextual conditions are more relevant in influencing the transfer of lean knowledge. Finally, to understand how a MNC can get closer to the ideal contextual conditions, the actions for organisational change are discussed in Section 2.3.

2.1. Mechanisms for the transfer of lean knowledge

Literature describes many mechanisms to transfer knowledge in MNCs. Scholars agree that their effectiveness depends on whether the transferred knowledge is explicit or tacit, as explicit knowledge is easily codifiable and can be shared by means of documents, while tacit knowledge is difficult to codify and hard to convey without interaction between parties (Kogut and Zander, 1993; Mohr and Sengupta, 2002).

Lean production involves concepts and practices that are characterised by a different extent of explicit or tacit knowledge. While technical and analytical practices concern more codifiable knowledge, concepts and practices concerning people and relations are more tacit and difficult to transfer (Henriksen and Rolstadas, 2010; Liker and Rother, 2011). However, lean practices are strictly inter-related. The success of lean depends on the systemic implementation of all core bundles of practices – i.e., JIT, built-in-quality, continuous improvement and a foundation bundle that comprises lean concepts and philosophy, organisational structure and people and stable and standardised process (Liker, 2004; p. 32). For example, as explained by Shook (2010), a proper implementation of the technical andon (or stop-the-line) practice requires that other more tacit elements, such as leadership, are put in place.

Inkpen (2008) recommended social interactions as a mechanism suitable for simultaneously transferring explicit and tacit knowledge enclosed in lean. This mechanism is pivotal in communicating 'the meaning and value of the knowledge' when introducing it in a plant (Inkpen, 2008; p. 449). Similarly, several studies stress the importance of using social mechanisms, such as interactions among lean experts, rotation of personnel and knowledge brokers, to effectively share and improve lean knowledge in MNCs (e.g., Ferdows, 2006; Henriksen and Rolstadas, 2010).

However, a number of scholars also underlined the relevance of codifying and sharing lean concepts and practices through standards collected in manuals and/or ICT and internet-based solutions (e.g., Spear, 1999; Bruun and Mefford, 2004).

Interestingly, Dinur et al. (2009) suggest a relation between mechanisms and contextual conditions when transferring knowledge within MNCs. In addition, Inkpen (2008) found that mechanisms are affected by contextual conditions, and contextual conditions can change during the transfer process of lean knowledge. This evidence highlights the relevance of understanding which mechanisms are most important as programmes evolve over time.

2.2. Contextual conditions in multi-plant lean programmes

MNCs are heterogeneous since they are embedded in different nations (Kostova, 1999), therefore practices developed by one plant may not fit contextual conditions of foreign adopters. According to a *practice-context congruence perspective* (Lozeau et al., 2002; Ansari et al., 2010), incongruence between contextual conditions and knowledge transferred may generate resistance to change and, if not properly managed, the preclusion of knowledge transfer.

Among the various contextual conditions that may affect the success of lean, cultural values are particularly important (Rich and Bateman, 2003; Kull et al., 2014; Bortolotti and Boscari, 2016). Scholars stressed the relevance of having specific organisational culture values and behaviours, such as the use of face-to-face and open communication, cooperation between employees and long-term approach to management (Rother, 2009; Bortolotti et al., 2015). They referred to these as *lean cultural values*, and found that such characteristics distinguish plants that successfully implement lean. However, cultural values characterising a particular nation may differ from lean ones, and the resulting incongruence is a leading explanation for unsuccessful lean implementations (Kull et al., 2014).

These studies highlight that adopters' contextual conditions can influence the success of lean, therefore should be considered when transferring lean knowledge in MNCs. In line with this, Ferdows (2006; p.8) argued that 'the ultimate aim (of multi-plant improvement programmes) is to create a powerful mindset in every production unit'. These ideal contextual conditions favour knowledge transfer in MNCs. In case of lean, such mindset is characterised by the existence of lean cultural values in the production network, but it also requires *strong relations* between plants.

Although underestimated by studies on multi-plant lean programmes, literature on knowledge transfer highlights the importance of relations between the parties among which the knowledge is transferred (e.g., Kostova, 1999; Van Wijk et al., 2008). Scholars agree that strong relations, interactions and communication lead to greater knowledge transfer (Easterby-Smith et al., 2008), while independence and differences between plants hinder