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Integrating Lean perspectives and Knowledge Management in Services: application to the service department of a CNC manufacturer

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Abstract: Today, customers are more and more interested by the services surrounding the product. Services are increasing, in order to offer a more efficient package with less resources. Recently, the service sector was also hit by the deployment of new organizational frameworks, following the trend of the development of Lean approaches in the production. This article will present the first stage of the integration of these lean approaches in services jointly deployed with a KM perspective. An application of the proposed model will be presented thanks to the analysis of the functioning of a service department of a CNC manufacturer.

Keywords: Knowledge management, PSS, Lean service, case study, Service

1. INTRODUCTION

Since the 20th century, with the quick and deep development of globalization and the increasing of global competition, the benefits directly generated by the sale of products is becoming less and less. Customers are waiting for one stop solutions which include not only the selling of the products but also installation/set-up of the products as well as quick technical support in case of dysfunction. As a result, the Product service system (PSS) was born. Today, more than 70% labour force is engaged in this sector(Sassanelli, Pezzotta, Rossi, Terzi, & Cavalieri, 2015).

Toyota production system is a successful example (Dombrowski, Mielke, & Engel, 2012). Then Lean philosophy and its tool box has been largely applied in production sector. But in today's economy, the service became more and more, in order to offer a more efficient service with less resources – Doing more with less- will be the same objective for PSS oriented companies.

As the intersection between production sector and service sector, the higher performance is one of the most important objective of PSS. The application of Lean philosophy and its toolbox has been proved successful to improve the performance in production sector(Dos, Leite, & Vieira, 2015).

In today's knowledge economy, the knowledge is the only certain source of competitiveness. Nonaka has defined the successful company as a knowledge creating company who can constantly create and disseminate knowledge in an organization (Nonaka, 2007). The knowledge is defined as "a fluid mixture of framed experience, values, contextual information and expert insight that provides a framework for evaluating and incorporating new experiences and information" (Davenport, 1998). In today's information world, a successful company should know how to identify, collect, share and use a huge quantity of knowledge and manage this knowledge flow with a most efficient way.

1.1 Introduction of the case study

Following a top down mixed with a bottom up research approach based on a crossed path of case study(Yin, 2008) and grounded theory, we consider observations and data coming from real industrial environments while our research is highlighted by a scientific literature review. Our observations and analyses are also completed by qualitative data coming from industrial programs led by our industrial partner, completely in line with the grounded theory as detailed by(Engward, 2013). Hence, we present the example of Huron CNC tooling machines manufacturer, who is a manufacturer of tooling machine in France. This company is confronting the exigency of customer on the mechanical performance such as accuracy, reliability, speed and higher automatic level. Flexibility in service and product segments and diversification are the strengths of the sector. In recent years, the cumulative experience served to offer machining solutions, fixation and transmission based on innovation, personalization and customer focus. The latter is a key element of the technical and commercial success in this case. As a SME (small-middle size enterprise), the company has a fairly extensive customization of its various models (60 in catalogue) resulting in a final series of almost unique products. Furthermore, thanks to Huron's worldwide network, the deployment /setting up/training/after sales service are becoming the key sector of creating added value. The essential objective of the service is to offer the most optimized use of tooling machine. In a global economy, companies must also adapt to the customer's cultural context, and take account cultural and local setting of customers in order to offer a high level service.

In this context, Huron's strategy is clearly defined: to provide to mechanical industrial companies high-tech innovative products with high performances. The objective of this work focuses on the following two levers.

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• Providing the excellent service to the customer by Huron team and its worldwide partner.

• Preserving and transfer the competence and expertise of staffs inside the company.

By implementing a real services strategy related to the delivery of a machine tool, the company seeks to develop a methodological arsenal that must be clear, precise and easy to use in order to increase performance and efficiency of its key customer services with high added value and an important impact on its brand image.

1.2 Research deadlocks

The scientific question related to this improvement focuses on the issue of implementing a methodology for deploying and capitalizing on good practices when deploying / installing / training / service of CNC tooling machine in an international context.

The originality of this work lies in the joint implementation of Lean Management and Knowledge management in an industrial inter-cultural context. Even if it is not to prove that the KM is a key element of management (Mårtensson, 2000), its integration into a continuous improvement process "Lean" applied to intangible process may however raise questions (and sometimes even can be seen as an antagonist approach), taking particular account of the quantization value added of knowledge capitalization process. Moreover, few research works are interested in investigating existing synergies between these two concepts.

Both approaches (KM and Lean) revolve around building a formalized strategy and exploitation of the company's knowledge supported from Lean approach (dashboards with process-oriented indicators). The Lean approach allows to structure the implementation and deployment of a KM approach associated with a decision support system allows to formalize and streamline the Lean approach in the audit process and benchmark of performed actions.

A first scientific deadlock associated is therefore to define a basic knowledge model adapted to the targeted industry. This database will update, enhance, preserve and manage critical knowledge to form a real corporate memory. Analysis of good practices for generation's previous products and services have arisen to be integrated into this model. An original approach, the practical outcome of Training within Industry (TWI) and labour standard can be used to analyse the work, and to identify key issues and the raisons. Meanwhile, the aspect of transmission of knowledge / training / evaluation skills of employees participating in the identified service process will be discussed. A second scientific deadlock consists in the specification of the decision support system, taking into account the high stresses associated with the study; namely context of extended enterprise (preserving the core business expertise the company) and a intercultural context (habits and customs between the different industrial payer and client). A third scientific deadlock will focus on the definition of local or global indicators for characterizing a process from a performance view and to define the expected objectives of excellence in relation to the experience feedback on actions previously undertaken; in the context according to these constraints and previous method. In this article, we will be mainly focused on the first research deadlock. But in order to build an adequate database, relationship between Lean service and KM concepts must be identified and analysed. Hence, after a literature review upon the concept of services, we will analysed the links existing between KM and Lean in the service sector thanks to the lean tools that can be used to get rid of the service's "Muda".

2. LITERATURE REVIEW

Today, modern corporations are offering fuller market packages or 'bundles' of customer-focused combinations of goods, services, support, self-service, and knowledge. But services are beginning to dominate (Vandermerwe & Rada, 1988), these economy revolution is named as "Servitization". As one special case of the "servitization", PSS (Product Service System) was established in 1999 by Goedkoop, He defines the PSS as a marketable set of products and services that are capable of jointly fulfilling customers' needs in an economical and sustainable manner (Reim, Parida, & Örtqvist, 2014). In the PSS, a manufacturing company sets its market proposition on extending the traditional functionality of its products by incorporating additional services for reaching new market competitive advantages (Goedkoop, 1999). Then in 2010, the term IPSS also noted as IPS² (Industrial Product-Service System) is characterized by the integrated and mutually determined planning, development, provision and use of product and service shares including its immanent software components in Business-to-Business applications and represents a knowledge-intensive socio-technical system (Meier, Roy, & Seliger, 2010). We can also find some other relative definitions such as Service-dominant logic : Service-dominant logic: the service is provided in interaction with customers, but more controversially, that goods purchased and used by customers become a delivery mechanism for service (Ford, 2011); Functional sale: Within functional sales, the function-providing company decides how to fulfil the function that the customer is buying (Sundin & Bras, 2005).

If we compare these 5 terms, servitization is a general representation, it figures a new type of economy which includes the different economic activities. In this paper, by studying the link between KM and LEAN, we want find a new way for introduce the PSS in a SMEs

3. LINKS BETWEEN LEAN SERVICE AND KM

In the service sector, similar to the material flow in production, the added value of the service is created by using the knowledge of individual or a group. We can call this knowledge flow. By this way we can use the Lean tools to improve the knowledge flow.

Bicheno and Holweg has identified 7 types of service waste in 2009(Bicheno & Holweg, 2009).

The Delay on the part of customers waiting for service, for delivery, in queues, for response, not arriving as promised. The