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Legend and Future Horizon of Lean Concept and Technology

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Abstract

The one of the bestselling business publications entitled “The Machine that Changed the World” stressed the distinctive feature of the way of management of Japanese car industry in terms of the name of lean management. It is well known world-wide that lean management was born in Japan but not quite well recognized on the origin. Essential concept could be formulated during Japanese turbulent period in 15th to 16th century, of which key point is fighting with an indomitable spirit, and is inherited to the concept of making unremitting efforts for business. Conceptual legends are perfect elimination of Muri (Strain), Mura (Variegate), Muda (Waste) on the Plan, Do, Check and Action Cycles (PDCA). This paper tries to figure out historical trend with remarkable milestone concepts of lean management and its future horizon. These includes white box vs. black box approaches, proactive vs. reactive operations and similarity-based model analysis.

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1. Introduction

Back to 1990, “The Machine that Changed the World” was published, which is one bestselling book on the way of manufacturing businesses that was named “lean production” in this book [49]. It stressed the distinctive feature of the way of management of Japanese car industry, however, described feature is not necessarily Japanese car industry

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but also other manufacturing industries in Japan including almost all fabrication and process industries. Lean management, of which shop floor version is lean production, is actually a tradition of Japanese way of organisational management. Original concept could be recognized in Japanese turbulent period in 15th to 16th century. Typical example is “Akazonae: A type of military unit used in feudal Japan” that means Red Colour-armed Soldiers originated by Takeda and Sanada warriors. The key point of this concept is fighting with an indomitable spirit and it is inherited to the concept of making unremitting efforts for business called “contradiction-driven approach” which must be the kernel concept of lean management. From early Meiji era (1868~), Japanese newly established civilian government conducted to creating industrialized society and encouraging to catch up related technology from mainly western countries. In early Showa era (1926~), industrialization has been took off gradually including establishment of Toyota Motor Co. and many relevant methods contributing productivity have been developed and transferred among industries.

Conceptual legends are perfect elimination of “Muri” (Strain), “Mura” (Variegate) and “Muda” (Waste) on the platform of Plan, Do, Check and Action Cycles (PDCA). Nowadays, all of these words are well known among industrial professionals and concerned academicians over the world. Based on the above issues, this paper tries to figure out historical trend with remarkable milestone concepts of lean management and its future horizon with related technologies. These includes white box vs. black box approaches, proactive vs. reactive operations and similarity-based model analysis.

2. Legend of lean concept and technology

2.1. Concept

In this section, concept of lean operations management is discussed [8][9].

(1) Background

In general, manufacturing systems offer conversion process from resource as input to results as output, where the essence of lean is to realise fewer resources with higher level of results than ordinary manufacturing processes [6][7].

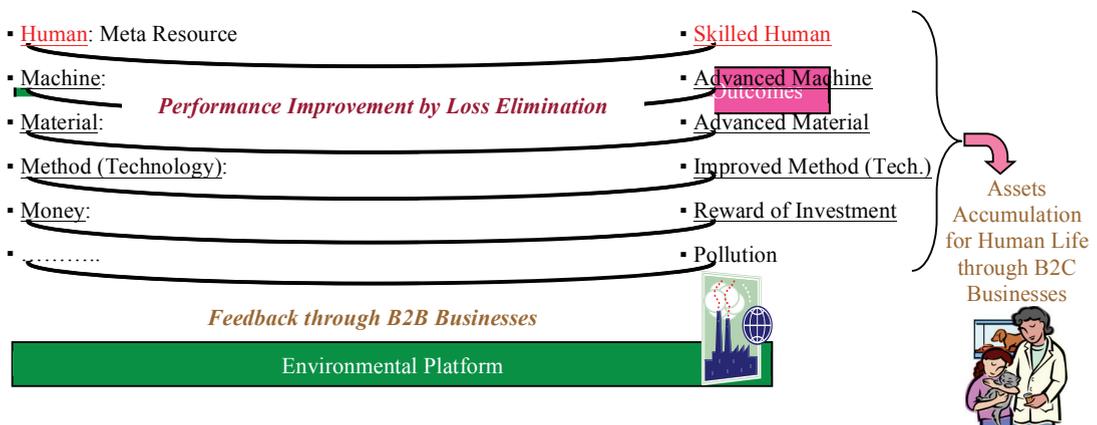


Fig. 1. Relationship among resources and outcomes in manufacturing [28]

That is, it tries to attain ultimate efficiency with business effectiveness, which can bring firms to a world-class organisation. This particular constitution suggests that business organisations, not only manufacturing systems, must be trained rigorously for better outcomes with fewer inputs like world-class athletes. Figure 1 illustrates the particular viewpoint on the relation between resources and results of lean management, where resources consist of

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