Chapter XXIX
Lean and Global Product Development in Auto Industry

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ABSTRACT

Original equipment manufacturers (OEMs) in automotive industry are faced with the conflicting goals of creating vehicles with higher reliability, increased feature content and quality while lowering model runs, reducing costs, and shorter developmental times. However, to achieve these goals is very difficult in a global product development environment that involves globally distributed OEMs and suppliers working on the components and subsystems of the same but a complex product like an automobile. This is especially true with regard to electronic systems in automotive industry due to the continued and significant increase in overall electrical content in a vehicle, and the historical short lifecycle of enabling technologies. For example, in the last three decades, electrical/electronics control has gone from 100% analog to primarily digital microprocessor based controls (Paras et al., 2004). As the level of integration occurs, automotive electronics are going to be challenged by software development and integration. As a result, it is going to increase overall product development time and cost. While it has been a growing concern for both academician and practitioners, the prior literature is still very limited in terms providing a clear or sufficiently structured framework to address the issues of global product development system. This chapter attempts to narrow down this gap by presenting a lean and global product development (GPD) framework and the necessary enablers to achieve this end. The framework is demonstrated through an automotive industry case study.

1. INTRODUCTION

An efficient product development processes is key to success of any new product. If managed and executed properly, it enables the manufacturing company to develop newer products at a lower cost faster speed than its competition. An article published in *Auto insider* describes that the American car companies General Motors, Ford Motor Company, and DaimlerChrysler, have seen their US market share decline steadily over the past ten years. Similarly, their stock values have tumbled by nearly fifty percent. On the other hand, consumer's demand for newer features and more varieties at lower price is on the rise (Yadav et al., 2007). Research shows that the innovative companies with respect to both product and process are consistently becoming more profitable (Kearney, 2005) than those that are less innovative.

In addition to innovativeness, another important attribute of a successful enterprise is the flexibility of its product development and manufacturing processes. Sobek et al. (1998) suggest that the flexibility of PD system is an important enabler to success in the current volatile and rapidly changing environment. Thomke (2007, page. 194) implies that the widely used stage gate PD process becomes very rigid and expensive if we fail to thoroughly understand customer requirements early on. According to Yadav et al. (2207), "flexibility and effectiveness of PD processes depend on various other factors such as design activities and tools used, their planning and scheduling, information flow structure, quality and availability of information, and decision making approaches". While design tools and techniques are the critical enablers, an integrated product development process or system is pivotal to the overall success of any PD factory. Past studies have revealed that individual best practices and tools are helpful, but in order to reap the full benefits, such practices should be implemented across the board including suppliers and customers (Nepal et al., 2007).

Global auto leaders such as General Motors and Ford are no longer a vertically integrated company. A significant amount of components and sub-systems used in their vehicles are developed by globally distributed suppliers. As the pressure to reduce the time-to-market, and improve quality and reliability of the vehicle is ever increasing, it calls for an efficient overall product development system including suppliers to achieve these objectives. Further, automotive product development is more complex than it seems from outside given the fact that much of the larger OEMs such as GM and Ford own other smaller companies with totally different cultural background. For example, Ford currently owns Mazda, and Volvo in addition to its traditional Ford, Lincoln and Mercury brands. Therefore to optimize its global PD resources and reduce the development time and cost, it has to create a process that allows sharing the components across its different brands. It requires an ability to process reconfiguration, new product architectures, and powerful technology and tools to connect globally distributed teams (Howell and Shu, 2002). Such effort not only provides an economy of scale but also improve the product quality hence reduces its warranty expenditures. In other words, the emphasis on product development process of the global product development company should be to develop innovative, unique, relevant products that can fill real customer needs in terms of variety, and yet, make the company more profitable by taking waste out of its PD process. Nevertheless, the challenge is how one can deal with the increased proliferation of product offerings that makes the supply chain network more complex (Mikkola and Skjoett-Larsen, 2003). Therefore, a lot of hard work and significant investment is required early on in order to take full advantage of global product development.

While there is ample discussion in the published literature on the development of products for global market (Graber, 1996; Howell and Shu, 2002; Thomke and Nimgade, 2001) or global