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The strategic role of Engineering Asset Management

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ABSTRACT

The current concept of an asset management (AM) system focuses on the lifecycle of engineered assets and little has been done in the literature on its link to organizational strategy. In this paper, the AM system's position within an organizational structure and its role in competitive strategy has been explored. Two case studies involving AM have been analyzed using a proposed framework which is comprised of a set of planning and control activities maintaining a control mechanism and a relationship with the strategy-making process. It is argued that the AM system structure and the mechanism play a key role in the organizational strategy. The existence of the AM system is hypothesized by this framework which stipulates the asset performance required for strategic success. The use of this framework allows for conclusions to be drawn on the requirements for building an effective connection between AM activities and strategy development. This connection is achieved through planning and control mechanisms acting on the asset-related activities. On one hand, the effect of inadequate or missing elements of the framework has been shown to result in negative impacts on cost, productivity, quality, business outcomes and ultimately strategy achievement. On the other hand, the existence of elements of this framework has been shown to have positive impacts on strategy achievement.

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1. Introduction

Engineering Asset Management (AM) as a discipline addresses the value contribution of AM to an organization's success (Amadi-Echendu et al., 2007). The AM system may be defined as: "the system that plans and controls the asset-related activities and their relationships to ensure the asset performance that meets the intended competitive strategy of the organization". This system has significant potential to influence all aspects of asset's life cycle activities from concept design to disposal. The AM activities focus on controlling the life cycle activities of assets but their nature is both interdisciplinary and collaborative.

Most reported research on AM focuses on discrete activities e.g., maintenance, and rarely extends to AM as a holistic system. Frolov et al. (2009) state that historically AM was viewed as a technical activity driven by engineering design and narrowly focused on reliability and maintainability of assets. Charles and Alan (2005) explain that the concept of the AM system has not been considered from the whole life cycle approach and the whole related activities. Ouertani et al. (2008) explain the importance of considering life cycle activities in AM.

It is suggested that the usefulness of a holistic system view of AM has been identified but is not fully developed. The concept of AM which involves more business related engineering disciplines has only emerged and reported in literature relatively recently (see, for example, Dornan, 2002; LoPorto and Udo, 2003; Mohseni, 2003; Amadi-Echendu, 2004; Charles and Alan, 2005; Narman et al., 2006; Stapelberg, 2006; Haffejee and Brent, 2008; Asset Management Council, 2009). It has become the focus of industry groups, professional societies and research organizations including IPWEA (2011) and Asset Management Council (2009). Based on the practice of particular organizations, several frameworks resulted from experience or specific personal understanding have been reported or published by individuals or their organizations. In general these are not grounded in existing theory nor analyzed and investigated to determine their usefulness. Verification of the fitness of frameworks for the academic research or particular AM purpose is essential. According to Frolov et al. (2009), the collaboration between organizations and academic researchers is under way to extend the body of knowledge in this area.

This relationship between the competitive strategy and asset-related activities such as maintenance has not been explicitly developed and is usually anonymous in most organizations. Literature reviews by Alsyof (2006) and Pinjala et al. (2006) indicate a lack of studies on the contribution of maintenance to positive business performance. Ouertani et al. (2008) argue that maintenance has an impact on the capability and performance of assets and that this should be viewed in terms of value contribution.

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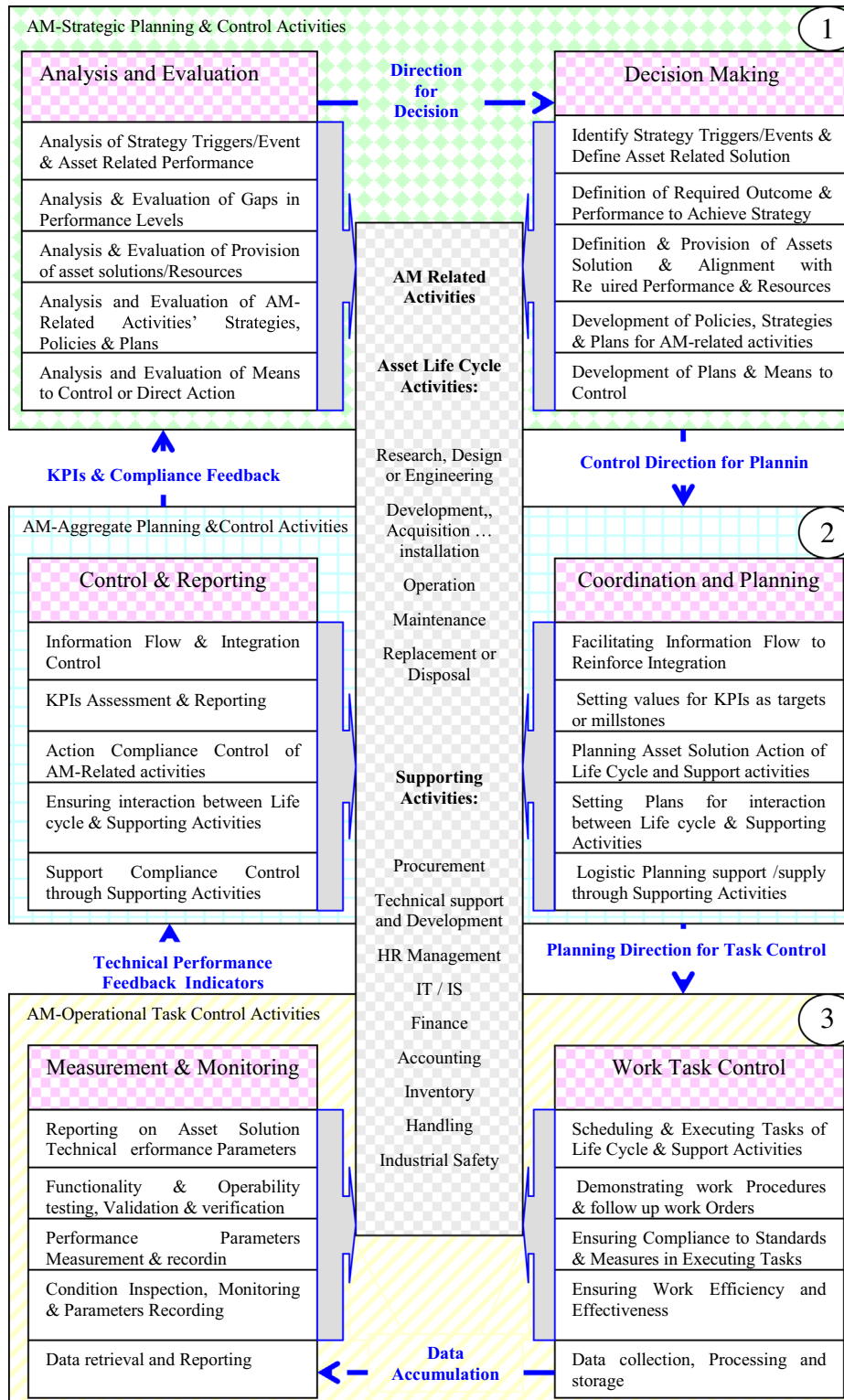


Fig. 1. Framework of AM system activities, relationships and mechanism (El-Akruti, 2012).

Maintenance is typically considered by organizations to be a ‘cost center; for example, [Alsayouf \(2006\)](#) and [Muchiri and Pintelon \(2008\)](#) show that maintenance is often treated within organizations as ‘subordinate to operations’ or a ‘necessary evil’. The link between the inputs to the maintenance process and the outcomes for manufacturing has not been explicitly established ([Dwight, 1999](#)). [Bamber et al. \(2004\)](#) indicate that both lean and agile manufacturing consider the role of maintenance as a key of competitive advantage.

It has long been recognized that organizations experience significant shortfalls in their strategy realization because of asset performance. [Miles and Snow \(1978\)](#) have shown that new strategies have failed due to inadequacy in the activities required to manage the new assets, systems or technology. Some studies have focused on the interface between project management and strategy ([Morris, 2004](#); [Srivannaboon and Milosevic, 2005](#)). Other studies, e.g., [Donovan \(2002\)](#) showed that inadequate feasibility

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