A Product Development Architecture with an Engineering Execution Representation of the Development Process

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Abstract. Successful development projects share common characteristics and attributes documented in project management curriculums and professional societies. This report gives tribute to those common elements as well as advancements in Systems Engineering to provide guidelines for system life cycle processes and activities.

Closely guarded by many corporations is the actual product development “process” which includes the steps, critical decisions, and roadmaps that enable a development team to efficiently evolve products from conceptual design to delivery and support. This paper addresses the question “can a single tailorable product development architecture be formulated and selectively optimized to address specific needs of a commercial or military application?” It will also guide the reader through a case study of creating a product development architecture and the benefits derived from the journey.

This approach will take a different perspective than the management, planning, and control viewpoints of product development and engage the topic with an engineering execution representation.

1 Introduction

The waste in traditional Product Development programs, results from a number of causes: craft mentality of engineers, poor planning, ad hoc execution, and poor coordination and communication cultures. (B. Oppenheim, 2008)
Figure 1 below provides evidence from a study of Product Development (PD) efforts which establishes a challenge and opportunity for improved methods and tools.

Acknowledgment must be given to the term *product development*. While it may be convienient to refer to these initiatives as products, the final deliverable is often a *system*, typically distinguished by the level of complexity.

While attempting to present a comprehensive view of a product development architecture, there are constituents that are not addressed in this research which must be inscribed within the product development architecture or as a component of portfolio management which include marketing analysis, product pricing, and end user testing.

Models and representations of the product development process may use the terms “architecture” and “framework” inter-changeably, although the use of “framework” is frequently associated with portrayals such as DoDAF, MoDAF, and Zachman. The term “product development architecture” used throughout this paper will refer to a substructure within the enterprise architecture.

2 Motivating Factors

The fact that most projects still fail in some manner, suggests that conventional project management does not meet current business needs. Although the conventional project management body of knowledge forms a good foundation for basic training and initial learning, it may not suffice for addressing development of complex systems. (Shenhar & Dvir, 2007)