

# Defining a flexible value framework for digital products and services using systems engineering and AI approaches

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**Abstract.** As digital transformation reshapes business practices across numerous industries, a growing need exists to systematically characterize the intrinsic value of digital products and services (DPS). Value comparisons are central to prioritizing project backlogs for groups constrained by budget, headcount, or time. Rationalizing ongoing work also requires assessments of project value to support the decision to discontinue efforts, including those associated with long-duration R&D. A survey of recent literature reveals several proposed DPS value frameworks to address this business need. However, no unified set of value elements collectively defines the utility of individual DPS activities. This paper addresses whether a coherent framework can be derived from multiple disparate DPS value models within the publication record. The problem space is evaluated through a multi-disciplinary lens, using concepts from systems engineering, computer science, and project and portfolio management. Results from optimizing a design structure matrix (DSM), contextual clustering using a natural language processing (NLP) model, and evaluating a hybrid DSM with NLP-derived similarities all reveal the potential for a hierarchical value framework. Each level defines a different granularity of value decomposition. Firms may identify the framework complexity that best suits the needs of their organizations, enabling management to balance DPS portfolios and resources more optimally. Furthermore, the approach allows for flexible updates as additional publications come to light, shifting the focus away from a rigid framework and toward an evergreen perspective on work item valuation.

**Keywords.** Value Engineering, Design Structure Matrix, Machine Learning, Systems Thinking, Product Design and Development, Portfolio Management

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