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**ESTIMATING RETURN ON INVESTMENT AND VALUING REAL
OPTIONS IN ACQUISITION: "MARKET COMPARABLES"**

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by

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Proceedings of the Annual Acquisition Research Program

The following article is taken as an excerpt from the proceedings of the annual Acquisition Research Program. This annual event showcases the research projects funded through the Acquisition Research Program at the Graduate School of Business and Public Policy at the Naval Postgraduate School. Featuring keynote speakers, plenary panels, multiple panel sessions, a student research poster show and social events, the Annual Acquisition Research Symposium offers a candid environment where high-ranking Department of Defense (DoD) officials, industry officials, accomplished faculty and military students are encouraged to collaborate on finding applicable solutions to the challenges facing acquisition policies and processes within the DoD today. By jointly and publicly questioning the norms of industry and academia, the resulting research benefits from myriad perspectives and collaborations which can identify better solutions and practices in acquisition, contract, financial, logistics and program management.

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Estimating Return on Investment and Valuing Real Options in Acquisition: “Market Comparables”

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Abstract

Problems may arise when leaders in non-profit and governmental organizations, such as the Department of Defense, attempt to discuss the “value” of an asset in use. This is because there are no revenue streams in such organizations. The results are non-productive debates about the relative value produced by assets, especially intellectual capital assets (e.g., knowledge in people or in information technology). This presentation focuses on how the market-comparables approach can be used to establish surrogate revenue estimates for defense process outputs. We will provide a case example of this approach in the application of open-architecture principles to the “track management” function of shipboard combat information centers.

Market comparables is an approach to the valuation of a business entity based upon the performance of comparable entities in the greater marketplace. Valuation methods such as the market-comparables approach are based upon the assumptions that the value of an interest in a business depends upon the future benefits that will accrue to the owner of that business. The best market-comparables approach is to project some category or categories of future benefits of ownership in companies comparable to the company being valued. This approach typically includes some measure of economic income such as cash flow, earnings or dividends among the comparable companies.

When determining the market comparable value of a business entity, the parties involved may rely on historical or projected benefits. Both approaches can be considered valid if the underlying assumptions are known and understood, and all parties related to the valuation are in agreement. Historical revenue and cost data are considered evidence of past performance and tend to be easier to gather and create consensus than projected benefits.

There are typically two approaches to market comparables: one that focuses on the performance of comparable companies and one that focuses on the comparable value of real estate assets. The first approach depends on historical financial performance of comparable companies as well as projections of the future cash-flows of the companies. This market-comparables approach did not make sense in the context of attempting to derive a revenue estimate for governmental processes since there are no comparables in terms of cash-flow-based performance. However, the real estate asset comparables provides a useful path because it is based on the assumption of common units’ comparisons in terms of selling price per square foot of the asset.

The market approach in real estate looks at comparable properties and determines a price basis within a common market, usually for the purpose of securing a loan on the property. For example, most residential real estate is valued based upon the price per square foot of comparable properties that have already been sold. In a given market, the first step in



determining a price is to multiply the square footage of the property by the market average price. Then, other factors such as location and amenities will add or deduct value to arrive at an acceptable price. Final valuation of the property is based upon the market and negotiations between buyers and sellers.

In terms of the valuation of assets at the sub-corporate level, several of these approaches can be applied even though they are generally geared towards the valuation of the entire corporate entity. On the one hand, we advocate comparing common units of output among commercial and governmental processes, which is similar in nature to the comparison of price per square foot. On the other hand, we use these common units to establish a price per unit that can be aggregated in the governmental processes to establish a revenue estimate.

To accomplish this, we use the KVA approach to establish common units of output for DoD processes and comparable processes in for-profit companies. The commercial companies' revenue is allocated to their common units of output from all sub-corporate processes. This establishes a range of prices per unit of output among the sampled commercial companies. The average price per unit then can be applied to the outputs of the comparable DoD processes to achieve an aggregated revenue figure (i.e., average price per unit of aggregated output in terms of the number of common units of output). In this way, revenue streams are assigned to the processes. Because the amount of units of output from each process asset is known, the surrogate revenue for each asset can be assigned.

In terms of choosing the approach to valuation, there are several factors to consider. The foremost is related to the choice of the assets to be valued. This choice revolves around the idea of which aspect of the asset means the most to the valuation. Is basing the value upon the physical characteristics of the asset itself or on the core processes a better determination of value? For example, the Puget Sound Naval Shipyard in Bremerton Washington is the Navy's sole site for the overhaul of Nuclear-powered Aircraft Carriers. If one were to make a market comparison based upon the physical nature of the assets, one would need to find and value a commercial shipyard that overhauls large, nuclear-powered vessels. Unfortunately, that would be impossible. There are shipyards that build nuclear ships (Northrup-Grumman) but the comparison between a building yard and a repair yard will likely run into problems of scale and scope.

However, if the market-comparables approach were based upon a comparison of core processes, there would likely be a larger number of ready comparisons. The core processes of a shipyard that repairs large Navy (100,000 ton) vessels that require regular maintenance are comparable to commercial shipyards that repair large cruise ships and oil tankers. Both of these types of vessels can and do approach the size of an Aircraft Carrier; both are productive assets that need maintenance; and both are assets that need to be returned to productive service in a minimal amount of time. Thus, the comparison based upon core processes can create market-comparables valuation that might closely approximate that of the government shipyard.

In this presentation, we will discuss on-going research into a proof-of-concept application of market comparables to analyze the value of undertaking an "open-architecture" (OA) approach to the development of combat systems suites. The Program Executive Office, Integrated Warfare Systems (PEO IWS), OA Division is charged with implementing the Navy's OA plans, policies and initiatives. One of these initiatives is the development of an open-architecture approach to implementing a situational awareness (SA) system for the DD(X)



project. To accomplish this, PEO IWS has looked at both the AEGIS and SSDS platforms to determine specific elements of each track management system that could be reengineered using an OA approach for placement into the DD(X) program. In doing this, metrics must be looked at to determine the best modules that might be candidates for open architecture.

This research project gathered information from subject matter experts (SME) from the Surface Fleet and from training commands at Dahlgren (AEGIS) and Wallops Island (SSDS). The process information garnered from these SME's was aggregated to provide a value for each process using the KVA methodology. The resulting Return on Knowledge (ROK) was then by analyzed to determine where information technology, specifically with relation to open architecture, could be applied to enhance the operational capabilities of a Naval vessel. Finally, a market-comparables analysis was conducted on ROK values generated from a proposed model of the system. The output of this analysis provides the sponsor with a clearer idea of specific processes within the systems that could be reengineered with an open-architecture (OA) approach to provide the greatest efficiency to the operational fleet. The KVA data also provides the inputs to the analysis of the real options that the OA approach provides for IWS development.



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