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Analysis of life-cycle information exchange

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Despite computer technology advances that have driven paradigm-shifting changes in our personal and business lives, advances in facility delivery business processes are held back by information exchange practices that have remained virtually unchanged for decades. Motivating process change based on discussions of legal implications and commercial technology, as is common in trade press (Wilbur 2009), has clouded the real potential of such standards to radically improve business efficiency (Love 2004). While early adopters in the capital facilities industry have begun to benefiting from the use of open standards, the economic benefits of innovations are not widely understood. Given these concerns, a satisfactory analysis must address changes in process, cost of administrative activities, and levels and quality of service provided.

A recent innovation is the Construction-Operations Building information exchange (COBie2) format. COBie2 facilitates the capture of facility handover information during the facility life cycle (East 2009). COBie2 meets international user requirements, including interoperability between tabular representations, Spreadsheet Markup Language, and Industry Foundation Class (IFC) (ISO/PAS 16739) models. To assist business managers and end-users in their decision to implement COBie2 a "COBie2 Calculator" is being developed. The COBie2 Calculator models the process changes and economic impacts resulting from the implementation of life-cycle business process transformations that impact the entire facility delivery life cycle.

The development of the COBie2 Calculator was based on a series of interviews with early adopters of the COBie2 format. First, the stages of the project where facility handover related information was created were identified. For example, room schedules are created during early design. Equipment schedules created during the coordinated design phase. Interviews established the current document-centric creation, production, distribution, use, loss, and recreation of such information. A critical examination non-value added tasks consistent with the type of analysis conducted as part of the Toyota quality management program (Trischler 1996) pointed to areas where these current processes could be streamlined using COBie2 without impacting the information content being delivered. The examples in this paper were based on data from a recently completed two-story medical clinic of 4,500 gross square meters supporting 480 staff and patients in the western United States. The construction cost was approximately $11M USD.

Two currently completed examples from the COBie2 calculator evaluate the current and future construction shop drawings and equipment list processes. In the "future" process the COBie2 Calculator also includes the use of cloud-computing software platforms to facilitate the transmission of both document-based and information-based transactions. The table below shows the estimated

costs and savings when comparing traditional, document-centric, approach to delivering project data and a new information-centric approach using COBie2.

Table 1. Document- vs. information-centric approaches

Activity	Estimated Cost		Estimated COBie2 Savings		
	Traditional	COBie2	Total	per sq meter	% project cost
Construction Submittal Processing	$39,000	$11,600	$27,400	$ 6.09	0.25%
Production of Equipment Lists	$21,000	$7,900	$13,100	$ 2.91	0.12%

The results of this study illustrate the value of the COBie2 information-centric approach to the capture, processing, and distribution of building information artifacts independent of a building information model. The COBie2 Calculator described here is not a universal analytic tool but may be used to evaluate information exchange costs for portfolios of facility types similar to the ones modelled. Because the underlying model has not been validated against a wide range of different project types, the most appropriate use of the model and COBie2 Calculator would be to compare the relative savings possible using COBie2 instead of traditional facility delivery life-cycle information exchange processes.

Savings identified when using a COBie2-based process in the two examples provided were calculated as savings to the construction contractor. Since there is a widespread perception that the use of building information model information only benefits the owner, the results shown hear show a very large benefit directly to the construction contractor. The approach to evaluate business process transformation used in this paper enables allows contractors to directly determine how their business will be impacted and assess the level of risk that such changes may place on the firm.

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