

Improving the Accuracy of Time-driven Activity-based Costing by Stochastic Modelling

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In cost modelling for an activity in a company, e.g. a product production or a service, a recent technique is time-driven activity-based costing (time-driven ABC). The time used for an activity is seen as the sum of the times from the sequence of subactivities, called time-drivers. This activity time is expressed in the time equation, where it is modelled as the cumulative time of a number of included drivers (the partial time), and an error term (the residual time) for omitted drivers as some drivers are unknown or too costly to observe in practice. The time for a transaction – that is for a particular occurrence of an activity – is calculated from the estimated partial time, using the time per driver unit as obtained from interviews with personnel, and the driver volume or number of units in a driver as reported by the company computer system. A study of the error structure in the estimated partial transaction time is needed to identify an adequate set of drivers to include, in view of prediction of the true transaction time. The presentation will give an analysis and elements to solve this problem, based on mean squared error. It covers the following aspects: the stochastic error in the estimated partial transaction time at the within transaction level and the within activity level, the impact on this error when the time equation is refined by adding a time-driver, a sufficiency index to judge the pool of included drivers, a prediction/confidence interval for the true transaction time from the estimated partial time, and a protocol for designing the time equation.

Key Words: cost accounting model, mean squared error, error index.