Using Driver-Based Data to Create an IES Model

Specifically, to create IES's cost functions

1. Assign all cost objects to one of IES's six types of cost objects
2. Determine cost drivers for cost objects
3. Separate fixed costs from variable costs and assign them to appropriate cost objects
4. Compute slope of variable portion of cost functions and step costs
   - Slope = $/driver = activity/driver x resource/driver x $/resource
   - If set up/change over or maintenance involved, increase slope appropriately
5. Add capacity constraints to cost functions as required
   - If set up/change over or maintenance involved, decrease capacity appropriately
6. Create model structure

Converting Driver-Based Data to IES's Cost Functions

Example: *Time-Driven Activity-Based Costing,* Kaplan & Anderson, Chapter 5

1. Assign all cost objects to one of IES's six types of cost objects
   - Products
     - finished = valve (FV), pump (FP) and flow controller (FFC)
     - raw material = valve (RMV), pump (RMP) and flow controller (RMFC)
     - Design = valve (DV), pump (DV), flow controller (DFC)
   - Activities = design (V, P, FC); receive/production control (V, P, FC); make (V, P, FC), pack/ship (V, P and FC)
   - Labor = engineering, production, indirect, receive/pc, pack/ship
   - Machine = machine
   - Support = selling/admin

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   - Activities = design (V, P, FC); receive/production control (V, P, FC); make (V, P, FC), pack/ship (V, P and FC)
   - Labor
     - Engineering = design activity
     - Production = make activity
     - Indirect = make, receive/pc and pack/ship activity
   - Machine = make activity
   - Support = selling/admin

Converting Driver-Based Data to IES's Cost Functions

Example: *Time-Driven Activity-Based Costing,* Kaplan & Anderson, Chapter 5

2. Determine cost drivers for cost objects
   - Cost driver = units for products
   - Cost driver = # employees for engineering and receiving/pc labor
   - Cost driver = hours for all other activities and machine

Converting Driver-Based Data to IES's Cost Functions

Example: *Time-Driven Activity-Based Costing,* Kaplan & Anderson, Chapter 5

3. Separate fixed, step and variable costs and assign them to appropriate cost objects
   - Fixed = support ($350k)
   - Step = engineers, receiving/pc (for illustrative purposes)
   - Variable = all other
4. Compute slope of variable portion of cost functions and step costs
   - Slope = $/product = activity/product x resource/activity x $/resource
   - RMV = $16/valve; RMP = $20/pump and RMFC = $22/flow controller

Converting Driver-Based Data to IES's Cost Functions

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Computing Slope of Cost Functions

- NOTE: Pack/Ship labor cost function
  - There are a variety of ways to model this cost function. Given this is a demonstration model, the easiest method was selected.
  - Assumptions:
    - the time equation parameters of # of shipments and # of items shipped is constant across a range of volumes
    - But varies by product
  - Therefore:
    - Valve pack/ship slope = $49k/12k units = $4.08/valve
    - Pump pack/ship slope = $49750/12k units = $4.15/pump
    - Flow controller pack/ship slope = $12,500/2500 units = $5/flow controller

Computing Step Cost Functions

- Cost function when step and, therefore, slope = 0

Activity hrs/	ACR x RCR See NOTE	Cost function step
Design V	0.005 hr/valve	$9750/eng
Design P	0.02 hr/pump	$9750/eng
Design FC	0.16 hr/FC	$9750/eng
Receive/pc V	0.004 hr/valve	$3900/emp
Receive/pc P	0.004 hr/pump	$3900/emp
Receive/pc FC	0.03 hr/FC	$3900/emp

Computing Step Cost Functions

NOTE: There are a variety of ways to model this cost function. Given this is a demonstration model, the easiest method was selected.

- Assumptions for design and receive/pc:
  - Each production run requires some amount of design and receive/pc
  - Number of runs varies by product and number of hours varies also for design
- Thus
  - Valve, pump and flow controller design acr x rcr = respectively, 60 hrs/12k valves, 240 hrs/12k pumps, 400 hrs/2500FC
  - Valve, pump and flow controller receive/pc acr x rcr = respectively, 1.25 hrs/run x 40 valve runs/12k valves, 1.25 hrs/run x 40 pump runs/12k pumps, 1.25 hrs/run x 60 FC runs/2500FC

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Using Drive-Based Data in an IES Model

Example: *Time-Driven Activity-Based Costing,* Kaplan & Anderson, Chapter 5

4. Compute slope of variable portion of cost functions and step costs
   - If set up/change over or maintenance involved, increase slope appropriately
     - Make (labor)
       - Valve set up slope increase = (160 (set up hours) x $32.50/hr (set up labor rate))/12k (valve volume) = $ 0.43/valve
       - Pump set up slope increase = (192 x $32.50/hr)/12k = $0.52/pump
       - Flow controller set up slope increase = (576 x $32.50/hr)/2500 = $7.50/flow controller
     - Make (machine)
       - Valve set up slope increase = (160 x $22.50)/12k = $0.30/valve
       - Pump set up slope increase = 192 x $22.50)/12k = $0.36/pump
       - Flow controller slope increase = (576 x $22.50)/2500 = $5.18/flow controller

Converting Driver-Based Data to IES's Cost Functions

Example: *Time-Driven Activity-Based Costing,* Kaplan & Anderson, Chapter 5

5. Add capacities to cost functions as required
   - Step:
     - Engineering capacity = 120 hours/step
     - receive/pc capacity = 130

Converting Driver-Based Data to IES's Cost Functions

Example: *Time-Driven Activity-Based Costing*, Kaplan & Anderson, Chapter 5

5. Add capacity constraints to cost functions as required
   - If set up/change over or maintenance involved, decrease capacity appropriately
   - Variable: None of the cost functions in Chapter 5 had a fixed capacity; i.e., there were no capacity constraints. The required capacity was determined and the existing capacity increased or decreased as appropriate.

     However, to illustrate, if the machines were capacitated, their total capacity would be reduced because of set up by 928 hours (see figure 5.8) or, approximately 4 machines.

Converting Driver-Based Data to IES's Cost Functions

Example: Time-Driven Activity-Based Costing, Kaplan & Anderson, Chapter 5

6. IES model structure