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Cost Normalization Procedure for National Health Care Facility Benchmarking

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Outline

- National Health Care Benchmarking Program
- A Challenge
- Literature Review
- Methodology
- Health Care Normalization Method
- Normalization Procedure Example
- Conclusion and Path Forward



CII National Health Care Facility Benchmarking

- The Health care Benchmarking program is a collaborative effort amongst :
 - The University of Texas at Austin's (UT) Construction Industry Institute (CII)
 - The U.S. Department of Defense / Defense Health Agency (DHA)
 - The U.S. Department of Veterans Affairs (VA)

GOAL: To develop a methodology and process were to measure health care capital project performance in terms of cost, schedule, change, space, and best practice.

- Along with various industry partners (Round1):



A Challenge!

Medical Office Building (MOB) in San Francisco, US by Company A

Vs.

Medical Office Building (MOB) in Vancouver, Canada by Company B

Can we compare square foot cost (an absolute metrics) of these health care projects in a meaningful way?

Hospitals are complex building systems that are becoming more challenging with ever changing codes and regulations.

Cost Normalization Framework



Literature Review

- Normalization is needed for cost, time, and location
(Other healthcare project-specific areas such as shell space)
- Key: Selection of most appropriate indices
 - What type of index is suitable for health care specific industry?
 - **Input vs. Output vs. Hedonic**
 - What does each index represent?
 - **Materials, equipment, labor hours, market conditions, productivity, overhead and profit, hypothetical structure by location and/or time etc.**



Literature Review

Review of Cost Indices

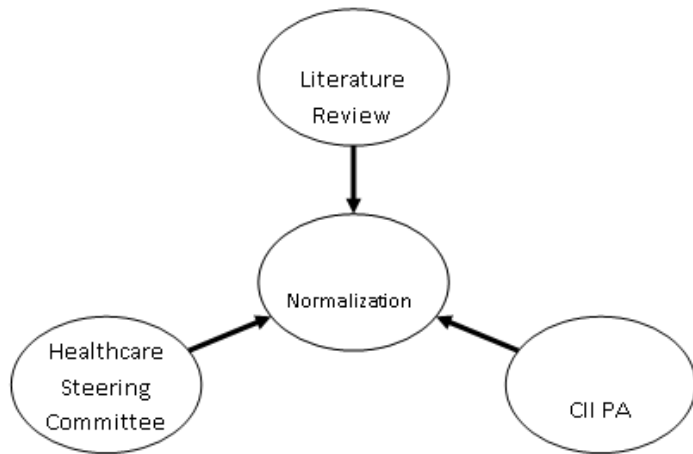
Cost Index	Cost Type				
	Labor Input	Material Input	Equipment Input	Assemblies Input	Location Indices
ENR	Yes	Yes	Yes	No	Input
Hanscomb	Yes	No	No	Yes	Input and Output
RS Means	Yes	Yes	Yes	Yes	Yes
RLB*	Yes	Yes	Yes	Yes	Output

* Rider Levett Bucknall Construction Cost Index

(Adopted from McCabe et al., 2002)

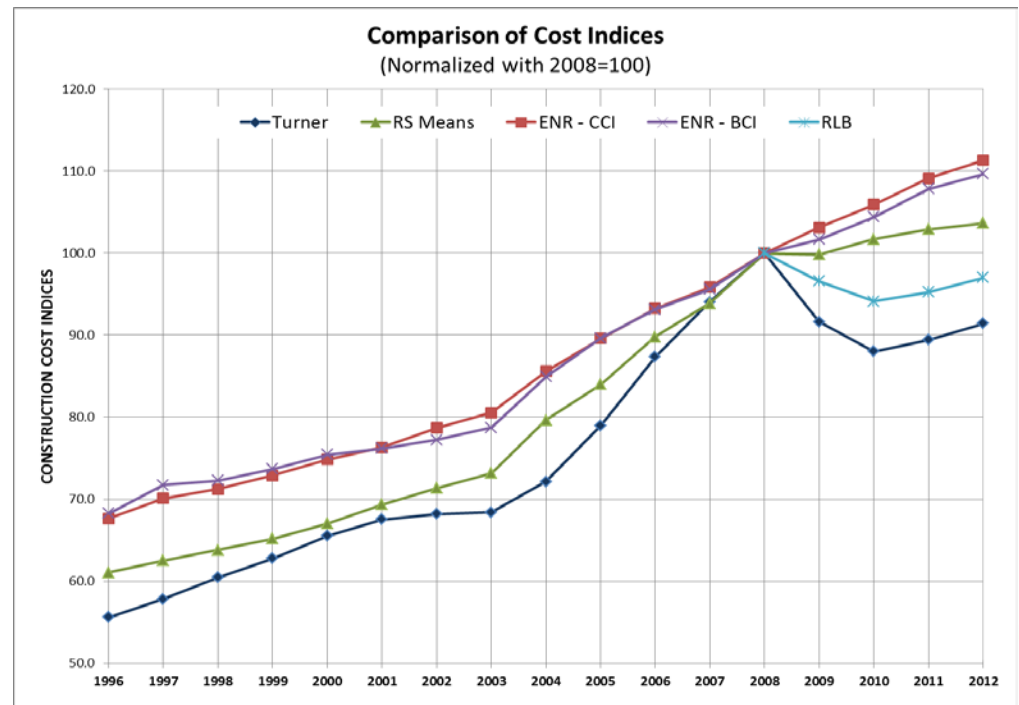


Normalization Methodology



Selection of cost indices:
The cost indices reviewed in the literature review were evaluated and compared over time with reference year 2008 to measure their sensitivity to economic changes during recession.

In CII's experience of developing similar systems for other industry, the key to success has been participation by industry. The industry leaders come together to develop a system that is defined by the industry for the industry (Mulva et al., 2014).



Health Care Cost Normalization Procedure

Currency Conversion



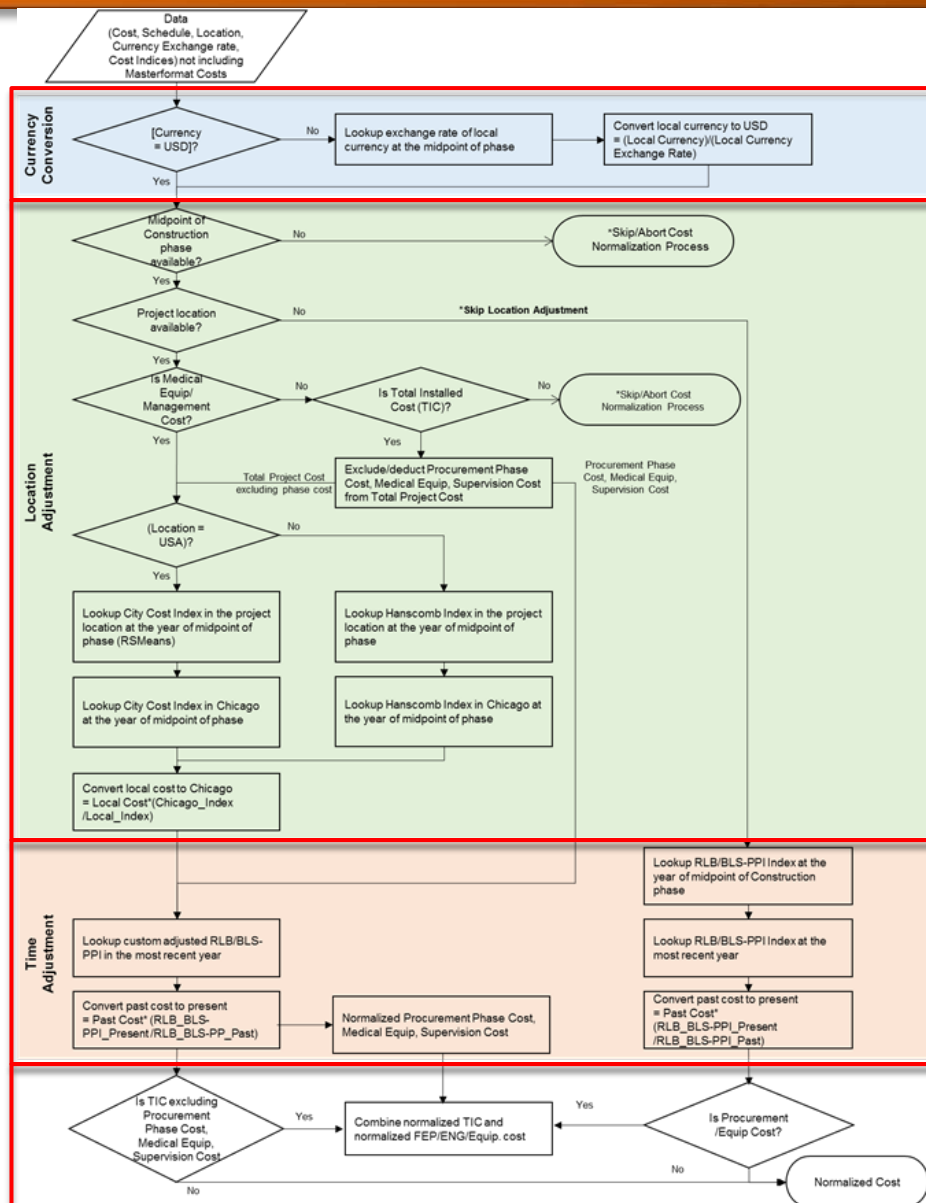
Location Adjustment



Time Adjustment



Aggregation



Cost Normalization Example

- A hypothetical example is presented in the paper for better understanding of the cost normalization procedure for health care facilities.
- Amongst diverse cost types, Total Installed Costs (TIC) is used in an example to present normalization procedure.
- Case project: Hospital built at Indianapolis, IL in 2007

Cost Breakdown

Cost Category	Local Currency
Total Installed Cost (TIC)	\$50,000,000
Capital Medical Equipment	\$10,000,000
Total A/E and Construction management Cost	\$5,000,000



Cost Breakdown & Net Cost Calculation

Cost Category	Amount in 2007 Indianapolis
TIC	\$50,000,000
Capital Medical Equipment	\$10,000,000
Total A/E and Construction management Cost	\$5,000,000
Net Cost to be normalized for location	$(\$50,000,000 - \$10,000,000 - \$5,000,000) = \$35,000,000$

Location Adjustment for Net Cost

Cost Category	Amount (2007)
Net Cost to be normalized for location (Indianapolis 2007)	\$35,000,000
Location Index Indianapolis - 2007	158.5
Location Index Chicago - 2007	191.9
Location Adjustment	$= 35,000,000 \times (191.9 / 158.5)$
Adjusted TIC (Chicago 2007))	= \$42,375,394

**Location Adjustment
Indianapolis → Chicago**

Combining Net Cost and Other Costs

Cost Category	Total Amount 2007
Adjusted TIC (Chicago 2007)	\$42,375,394
Capital Medical Equipment (Indianapolis 2007)	\$10,000,000
Total A/E and Construction management Cost (Indianapolis (2007)	\$5,000,000
Total Cost to be normalized for Time	$(\$42,375,394 + \$10,000,000 + \$5,000,000) =$ \$57,375,394.32

Time Adjustment from 2007 to 2014

Cost Category	Amount in 2007 Indianapolis	Amount in 2014 Chicago
Net Cost to be normalized for Time	\$57,375,394.32	
RLB/PLS-PPI Index Chicago	94.8	104.5
Time Adjustment	$= \$57,375,394.32 \times (104.5 / 94.8)$	\$63,246,083.40



Conclusion and Path Forward

- Normalization is essential for capital project benchmarking.
- This method is the first cost normalization procedure specialized in health care projects considering market condition and productivity factors.
- Methodologies for CSI* and Space adjustment are not included in this paper.
- No index is perfect, but choose the best appropriate one for normalization

* Construction Specification Institute



