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Indexing measures purchasing performance

AT SOME POINT IN your purchasing career you may think that all senior management majored in the same university course – Course 101: "What the heck have you done for me lately?"

That question often seems to be directed at supply chain professionals. Sometimes it seems like purchasing has to justify why it should be part of the organization more often than other business operations have to, which can be frustrating. In this article, I offer two case studies that show you the value of developing a tool to help you measure your performance and demonstrate the results to management – essentially to prove "what you have done lately."

In the bigger picture, it is difficult to significantly affect the bottom line contribution to profits as an aggregate value. Radical changes to manufacturing methods or outsourcing can have a more dramatic, visible and measurable effect, while incremental changes in costs resulting in savings may go largely unnoticed. In spite of this, purchasing must demonstrate annualized savings – like it or not, it comes with the territory. Costs and savings must be tracked and reported in an objective manner.

Without the right data and given our human nature, savings or cost reductions may often be reported out of context in order to favourably influence the reader's perception of purchasing's performance.

An objective tracking and reporting tool, with the ability to measure price or cost changes in a generic model, is now being applied to public sector and private organizations to assess performance. The model provides a means of evaluating strategic and tactical business practices by comparing in-house metrics with external cost drivers and indices.

To gain a fundamental understanding of how an in-house weighted-price index works,

consider how the Consumer Price Index provides information.

We can create an index by developing a representative basket of goods of the organization's frequently purchased items. We can then benchmark this index against other known indices and published business metric references and, within this context, objectively compare the results over time. This helps track our ability to manage costs; assess the effectiveness of our contract management; separate inflationary factors out of pricing factors; forecast budgeted costs more accurately; measure a component of negotiation performance; assess the influence on the profit-leverage effect; and identify cost avoidance benefits.

We can capture many of these issues with a minimal application of statistical theory. Using readily available software, such as Microsoft's Excel© (a spreadsheet program), this data can be massaged to report on many aspects of cost/price management.

My research was based originally on developing a weighted-price index to compare buying strategies in health care, as seen in Case 1 of the two case studies presented below that demonstrate how the price index model can be applied.

Case 1: Hospital medical/surgical supply agreement

To achieve savings, a BC-based health region of four acute care facilities joined a Canadian, national, not-for-profit buying group. One year later, the question was raised on how cost effective this strategy was proving to be. Could any incremental savings be measured to support the strategic shift from participating in a local, geographical buying group of hospitals to a nationally managed consortium of 120 hospitals, and still continue to buy similar products from similar suppliers? One of the anticipated bene-

fits of the shift to a national program was the ability to leverage buying power that would allow the BC hospital group to minimize supplier and product changes – a sensitive issue with medical professionals and practitioners.

Methodology: A price index uses a reasonably simple method of collecting and analyzing data to measure incremental changes to prices and then uses this as a basis to create an index.

To create the index for the BC hospital group, staff compiled a list of 100+ medical supplies used on a frequent basis. The supplies were characterized as being packaged medical/surgical supplies that comprise a significant portion of the annual operating costs. There is an expectation that the goods would be required on a continuous basis. Items purchased once or twice per year do not lend themselves to tracking via an index.

Using the actual costs from the database for the items in year 2000, they factored in the actual volume of usage for the items in that year. The actual volume from year 2000 gives the index its "weight." By multiplying the unit price by the volume, by each line item, the price of a basket of goods in 2000 was determined to be $1,102,655.00. This created the *index value* of 1.00 for 2000.

Items can be added or deleted over time – the index value relationships will still be relevant – but I would caution against changing the items too often. The initial items in the basket of goods should be selected with reasonable care. The data should be clean and be consistent as to whether it is a tax in or out value, or whether it is a landed cost or contract pricing – it only matters that the data referenced be consistent on a year-over-year basis.

By referencing the same items in the second fiscal quarter (Q2) of 2001 and by using the volume from 2000, staff extended the prices for each item again for comparison.

Depending upon the contract terms and other factors, some prices increased, some decreased, and some remained the same. The total cost for the same basket of goods for Q2 2001 was $1,047,742.00. This was $55,000.00 (net) or ~4.9 percent less as an aggregate value and led to an index of .951 for Q2 2001.

An in-depth review of the items was quite revealing. Many of the same products being purchased in 2001 had moved to a new supply contract through the national buying group. Of these items, they measured a 7.61 percent decrease off the invoice price where they participated on national contracts and

only 1.77 percent decrease on the other products. The latter were mainly localized agreements that the BC-hospital group continued to purchase through their previous buying practices, as not all items were yet available on a national contract basis. When using price as the definitive factor, the results of the comparison indicated that it was a favourable decision to participate in the national not-for-profit buying group.

Analysis and observation showed the new contracting strategy was effective; the contract management efforts were in line with expectations; the hospitals were not experiencing the anticipated amount of inflation;

there was better information to predict 2002 costs; the hospital buying staff were better utilized by working on localized product, equipment, and service requirements; the costs to meet servicing needs were lower; and many price increases were avoided during this period.

Later in 2001, staff compiled a Q3 index at .958 – a slight increase over Q2, but still less than their base 2000 prices. Without developing the index, purchasing would have been relying on anecdotal or an intuitive sense of their effectiveness to manage costs. When asked to prove their ability, human nature would likely have dictated that they

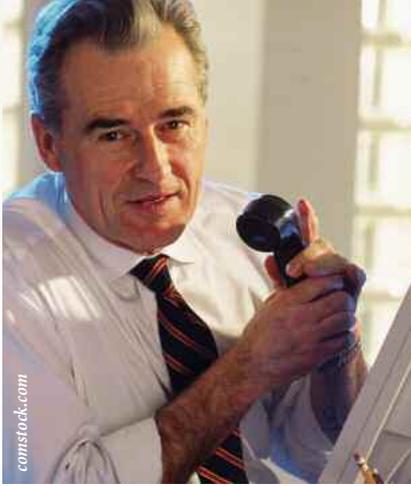## Table 1. Sample of a hospital's weighted-price index

#	ITEM #	DESCRIPTION	USAGE 00/01	2000 Price	2000 Total	Current Price	Sept 2001	Oct-Dec 2001 Pricing	Oct-Dec 2001 Totals
1	0006813	BAG URINE DRAINAGE	400	55.00	22,000.00	56.05	22,420.00	56.05	22,420.00
2	0004374	BALL COTTON MED	8	27.25	218.00	23.00	184.00	23.00	184.00
3	0000569	BALL RAY MED	21	27.25	572.25	19.00	399.00	19.00	399.00
4	0006868	BANDAGE CONFORM 3"	817	30.40	24,836.80	16.73	13,668.41	16.73	13,668.41
5	0006562	BANDAGE STRIP 1.5 × ⅞	106	53.12	5,630.72	52.47	5,561.82	52.47	5,561.82
101	0000872	TISSUE FACIAL WIPE	14	49.93	699.02	52.54	735.56	52.54	735.56
102	0006388	TRAY PEG ENDO GASTROSTOMY	16	285.00	4,560.00	360.00	5,760.00	360.00	5,760.00
103	0001243	TRAY SPINAL NEEDLE	118	211.76	24,987.68	222.00	26,196.00	222.00	26,196.00
104	0006700	TUBE CONNECTING ⁵⁄₃₂" × 72"	285	51.60	14,706.00	51.60	14,706.00	51.60	14,706.00
					1,102,655.47		1,047,742.35		1,056,358.30
				2000	1,102,655.47	Q2, 2001	1,047,742.35	Q3, 2001	1,056,358.30
			INDEX		1.00		.951		.958

Interpreting Table 1. In Table 1, #3 indicates 21 units were used in 2000 at $27.25 per unit, for a total of $572.25. Those items would cost $399.00 in Q2 and $399.00 in Q3. The index values are shown as .951 (1047742.35/1102655.470) and .958 (1056358.30/1102655.47), respectively. Weighting is the value realized by multiplying the annual usage by the unit price per fiscal period. The usage in the index model always remains the same as the first year, which allows the comparison on the affect of price changes over time. The price index focuses on the *aggregates values* and not on the *line items* per se.

Table 2. City of Granston (fictitious name) cost of supplies with external cost drivers and indices

	2000	2001	2002	2003	2004	Q-4 005
Granston: Cost of supplies	1.00	0.92	0.94	0.97	1.035	1.17
Business Prime Rate %	7.00	6.88	4.25	4.50	4.25	5.00
Cost to buy 1 USD	1.46	1.50	1.55	1.32	1.19	1.16
CPI	111.40	114.70	116.20	122.70	125.20	128.20
Fats & Oils	161.82	165.38	194.44	307.43	266.30	233.68
Raw Industrials	258.06	235.55	231.72	305.90	321.90	356.98
Textiles	236.39	230.50	221.41	253.33	235.77	253.15
Crude Oil USD Barrel	26.72	19.96	31.21	32.51	42.53	61.06
Diesel Fuel, per 100 Litres	50.36	52.56	54.34	56.05	69.31	85.33
Coarse Road Salt (metric tonnes)	57.28	52.91	52.91	52.91	52.24	53.28
Natural Gas	4.50	6.08	3.82	*6.03	*6.03	*6.03
Copper (USD per metric tonne)	1788.00	1578.00	1559.00	2055.00	3123.00	4269.00
NBSK Wood Pulp (USD per dry metric tonne			442.57	559.32	604.49	598.69
Metals Sub-index	236.06	193.55	178.92	271.92	356.25	445.14
Producer Price Index	141.60	136.00	139.80	145.50	151.30	158.40

Interpreting Table 2: Table 2 looks at the cost of supplies to the City of Granston and also tracks other cost drivers such as the business prime rate, crude oil, US/Cda exchange rates along with other indices such as the widely referenced Consumer Price Index and the Producer Price Index. The same goods in 2005 cost the City of Granston 17 percent more than in 2000 – with the price increases occurring over the past 1.5 years. If the purchasing staff were asked as to how well they perform at any time, using the time period 2000 – 2005, they could not accurately say without some bias in reporting. The Granston case was developed in 2003, and therefore, the staff actually did not know that their cost of supplies in 2001 had decreased over the 2000 costs – as the tracking had not been completed! This information was not available at the time. They now develop their cost of supplies index each quarter and are tracking trends based on 6+ years of data. The time to develop a quarterly index update is ~3 hours per quarter.

select items where they knew there were savings and to report those findings in a less objective manner.

The weighted-price index is more meaningful over time as trend lines become stronger. Hospital management can also drill down into segmented product groupings or apply this model to other commodities such as MOR (maintenance, operating, and repairs) items. It is now relatively easy to track their ability to manage costs. In addition to the indexing data, they should capture the key cost drivers such as energy costs, bank prime rates, exchange rates, fuel costs, base metal prices, or other metrics which influence the bottom line specific to health care. Table 1 is a sample of a hospital's weighted price index.

Case 2: The City of Granston[1]

In 2003, I had the opportunity to apply the price index model to a large municipal operation and to add more objective criteria to the model. The results are demonstrated here using the fictitious City of Granston. Although the City of Granston is fictitious, the case study is based on actual data, as is the data in Tables 1 and 2 and Exhibit 1.

Methodology: Basic data collection was similar to the hospital case. In this case, the basket of goods was comprised mainly of industrial-based, manufactured products along with other packaged goods from a wide, cross-section of civic operations. However, external indices and cost driver information was gathered to benchmark the city index values to other external data for the purposes of being objective. Table 2 shows the City of Granston price index history, cost drivers, and external indices comparisons. Exhibit 1 compares the Granston index to other cost drivers and indices.

Learning outcomes and applications for the price index model:
- Using the CPI as a reference on price reviews for contracts is questionable. The PPI may be more relevant or refer to the *core* CPI.
- Buying strategies should vary between periods of inflation versus deflation.

- The begin/end dates on contracts are very important.
- An index provides better information to challenge prices in negotiations.
- We should know the index values for our suppliers' key commodities.
- Each business should develop their own weighted-price index to monitor trends.
- Reducing your cost of supply index is difficult as an aggregate value.
- Efficient suppliers are cost effective.
- Can be used to track maintenance, operating, and repair items through a sub-index model
- Helps to develop future cost estimates.
- Awareness helps staff to understand aggregate values.
- May lead to the use of target costing.
- Benchmarking with other organizations and indices give a sense of effectiveness.
- Can be applied to the annual budget process for inflation.

This synopsis on indexing has been provided as a means of encouraging and expanding discussions among supply chain professionals on how to track costs and report objectively. ⋀⋀
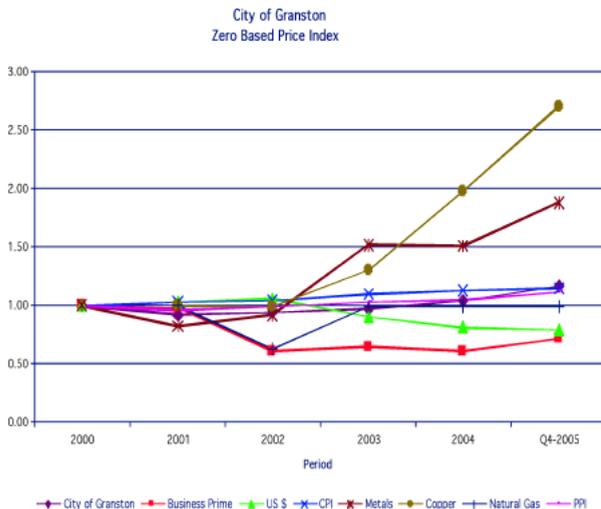
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[1] The City of Granston case, written by Larry Berglund, CPP, MBA and Collin Ashton, CPP, was first published in *Purchasing and Supply Management,* 13th edition. Homewood, Ill.: Richard D. Irwin Inc., 2005, Leenders, Michiel R., P. Fraser Johnson, Anna E. Flynn, and Harold E. Fearon.

Exhibit 1. A zero-based graph of indices

This assumes that all indices and cost drivers equaled a value of 1.00 in 2000 to show the changes in relative value between January 1, 2000 and December 31, 2005.