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Purchasing: What have you done for me lately? Using indexing to measure performance

One of the more interesting phenomenons in business is the day you realize your boss and everybody else's boss majored in the same course at university – the course they all completed was 'What the heck have you done for me lately – 101'.

This is most often directed at supply chain professionals as a means of justifying as to why have them in the organization. For many reasons, purchasing seems to have to justify its existence more so than other business service operations. It is mission critical for purchasing to demonstrate annualized savings. Like it or not – it comes with the territory. In the bigger picture, it is difficult to significantly affect the bottom line contribution to profits as an aggregate value. Incremental changes in costs go largely unnoticed. Radical changes to manufacturing methods or outsourcing have a more dramatic and measurable effect. In spite of this, it is important for purchasing to track costs and savings and to report out in an objective manner.

Human nature says that being objective in reporting goes against our self-serving interests. Therefore, savings or cost reductions are often reported out of context to influence the perception of the reader to assess purchasing's performance in a more favourable light.

The following article examines an objective tracking and reporting tool on the ability to measure price or cost changes in a generic model. It can, and is being applied, to public sector and private organizations as another tool 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.

The purpose is to develop an in-house price index and then benchmark against other known indices and published business metric references and within this context, objectively compare the results over similar time periods.

If we consider how the Consumer Price Index provides information, we get a fundamental understanding of how an in-house weighted-price index works.

By developing a representative basket of goods for the frequently purchased items by an organization, we can create an index to track our ability to manage our 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.

With a minimal application of statistical theory, we can capture many of these issues rather easily. With the assistance of readily available software such as Excel®, this data can be massaged to report on many aspects of cost/price management.

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The author's research was based on originally developing a weighted-price index to compare buying strategies in health care. We will look at two cases which demonstrate how the price index model can be applied.

Case 1: Hospital medical/surgical supply agreement.

It was a year after a B.C.-based health region of four acute care facilities had joined a Canadian, national not-for-profit buying group, and the question was raised as to how cost effective this strategy had proven to be. Could they measure any incremental savings to support their strategic shift from participating in a local, geographical buying group of hospitals to a nationally managed consortium of one hundred twenty hospitals – and still continue to buy similar products from similar suppliers? To reiterate, one of the benefits of the shift to a national program was the ability to leverage the buying power which allowed the B.C. hospital group to minimize supplier and product changes which are 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 B.C. 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 which are purchased once or twice per year do not lend themselves to tracking via an index.

Using the actual costs for 2000 from the database for the items, they factored in the actual volume of usage for 2000 for the items. The actual volume from 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.

It should be noted that items can be added or deleted over time. The index value relationships will still be relevant. The author cautions against changing the items too often. The initial items which go into 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 (2Q) 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 2Q 2001 was \$1,047,742.00. This was \$55,000.00 (net) or ~4.9% less as an aggregate value and led to an index of .951 for 2Q 2001.

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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% decrease off-invoice price where they participated on national contracts and only 1.77% on the other products. The latter were mainly localized agreements that the B.C. hospital group continued to purchase through their previous buying practices, as not all items were yet available on a national contract basis. The strategy to participate in the national not-for-profit buying group indicated a favourable decision when using price as the definitive factor.

The analysis and observation showed the new contracting strategy managed through the national buying group was effective; the contract management efforts were in line with expectations; the hospitals were not experiencing the amount of inflation they had anticipated; 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 they have avoided many price increases during this period.

Later in 2001, staff compiled a 3Q index at .958 which was a slight increase over 2Q, but was 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, due to the bias in human nature, they would likely have selected items where they knew there were savings and reported out on those findings in a less objective manner.

The weighted-price index is more meaningful over time as trend lines become stronger. The 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 drivers of costs 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.

See Appendix 1 for Sample of Hospital's Weighted-price index

Case 2: The City of Granston case¹. Written by Larry Berglund, CPP, MBA and Collin Ashton, CPP

In 2003, the author had the opportunity to apply the price index model to a large municipal operation and to add more objective criteria to the model.

¹ The City of Granston case was first published in Leenders, Michiel R., P. Fraser Johnson, Anna E. Flynn, and Harold E. Fearon. *Purchasing and Supply Management*, 13th edition. Homewood, Ill.: Richard D. Irwin Inc., 2005. Although the City of Granston is a fictitious name, it is based on actual data, as is the data in tables 1 and 2 and Exhibit 1.

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Methodology: Similar to the basic data collection as in the hospital case. In this case, the basket goods were 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.

See Appendix 2 for City of Granston price index history, cost drivers, and external indices comparisons

See Exhibit 1 for a graph comparing the City of 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 will give a sense of effectiveness
- It can be applied to the annual budget process to assess inflation

This synopsis on indexing has been provided by the author as a means of encouraging and expanding discussions on how to track costs or how to report out objectively as supply chain professionals. Further information can be provided by contacting the author at lberglund@prezplus.com

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Appendix 1

Table 1.
Sample of a Hospital's Weighted-price Index

#	ITEM #	DESCRIPTION	USAGE 00/01	2000 Price	2000 Total	Current Price	Sep 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 1.5X7/8	106	53.12	5,630.72	52.47	5,561.82	52.47	5,561.82	
					1,102,655.47		1,047,742.35		1,056,358.30	
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 9/32X72"	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	2Q 2001	1,047,742.35	3Q 2001	1,056,358.30
					INDEX	1.00		.951		.958

Interpreting table 1:

In the table above, #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 2Q and \$399.00 in 3Q. The index values are shown as .951 (1047742.35/1102655.47) 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.

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Appendix 2

Table 2.
City of Granston 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 US \$	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 U.S. \$ 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 (US \$ per metric tonne)	1788.00	1578.00	1559.00	2055.00	3123.00	4269.00
NBSK Wood Pulp (US \$ 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% more than in 2000 – with the price increases occurring over the past 1½ years. If the purchasing staff were asked as to how well they performing 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 our tracking trends based on 6+ years of data. The time to develop a quarterly index update is ~ 3 hours per quarter.

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Exhibit 1.

Interpreting 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.

