

# Choosing a Synthetic Oligonucleotides Supplier

## Key Factor Analysis & Branding Case Study

**Health/Pharmaceutical Research**

By



***WMB& Associates***

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*Statistical Services*

Editorial Note:

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## **Introduction**

### **Description**

“Overall, the market for commercially available custom oligonucleotides (oligos) has reached a certain level of maturity. Mature markets are those that have achieved a state of equilibrium marked by the absence of significant innovation. In such a situation, brand equity is difficult to establish and suppliers are challenged to differentiate themselves and/or their products in an effort to keep customers from switching to competitors. Customers in a mature market therefore enjoy significant leverage over their suppliers, and in an attempt to maintain market share suppliers often feel as if they have no choice but to compete on price with a resultant decline in profitability.

The oligo market has primarily been driven by the demand for DNA oligos, which constitute the overwhelming majority of oligo purchases. Yet the rapid and broad adoption of small inhibitory RNA molecules and RNA inhibition technology in general, to understand gene function has spurred demand for custom RNA oligos. Although still small compared to the broader market, the RNA segment is experiencing growth, the emergence of new suppliers and technological innovations that have the potential to disrupt the current state of equilibrium. However, the market as a whole, which includes both DNA and RNA oligos, can be seen as a mature market.”

*The description is extracted from the April 2004 report, *The U.S. Market for Synthetic Oligonucleotides: Establishing Differentiation for Success*, published by BioInformatics, LLC.*

The data collected for this project is based on a survey conducted by BioInformatics, LLC, an Arlington, VA-based market research and consulting firm in the life science, medical device and pharmaceutical industries through their market research panel of scientific customers—*The Science Advisory Board*. The Advisory Board consists of nearly 25,000 life science and medical professionals from 62 countries who participate in surveys that address emerging technologies, test customer reactions to new product concepts, measure brand awareness, and assess advertising effectiveness.

While the overall study had objectives that highlighted research trends driving the demand for oligonucleotides [oligos] in the United States, this paper is based on the author's part in the study's addendum research to determine key attributes in selecting a synthetic oligos supplier and estimating brand equity. The two tools used to meet these objectives are *P-E GAP Analysis* and *Indexing based on Derived Importance*.

## **“P-E GAP” Analysis**

GAP analysis is the “descriptive” for a methodology used to help understand the relationship between what is perceived to be “important” and the derived difference between performance and expectations [the P-E GAP]. For example, a consumer might note that “price” is very important in their decision to purchase an item. However, when asked what else is important in that decision, the consumer might also list another 20 items or attributes that are equally important. Thus, how does price actually “rank” in comparison to the entire set of decision criteria?

As with cause/affect models, such as regression and discriminate analysis, GAP analysis attempts to understand relative positioning. The value in GAP analysis is its simplicity and “pictorial” representation. However, GAP analysis does not determine any statistical relationship between these items of importance. GAP analysis is based on the comparison between an attribute's importance [mean rating] and the difference between the attribute's [mean] performance and its [mean] expectation, called the P-E GAP or the difference between performance and expectations.

The GAP Table that forms the basis of this analysis displays the mean results for each measured attribute based on its importance (I) to the respondent, the respondent’s perception of performance (P) of each attribute and then what the respondent expects (E).

The GAP Map is another form of the Quadrant Map that pictorially represents of the results with the P-E GAP on the vertical axis and importance on the horizontal axis. The four quadrants are based on the intersection of the overall importance mean and the P-E GAP [illustrated in Figure 1].

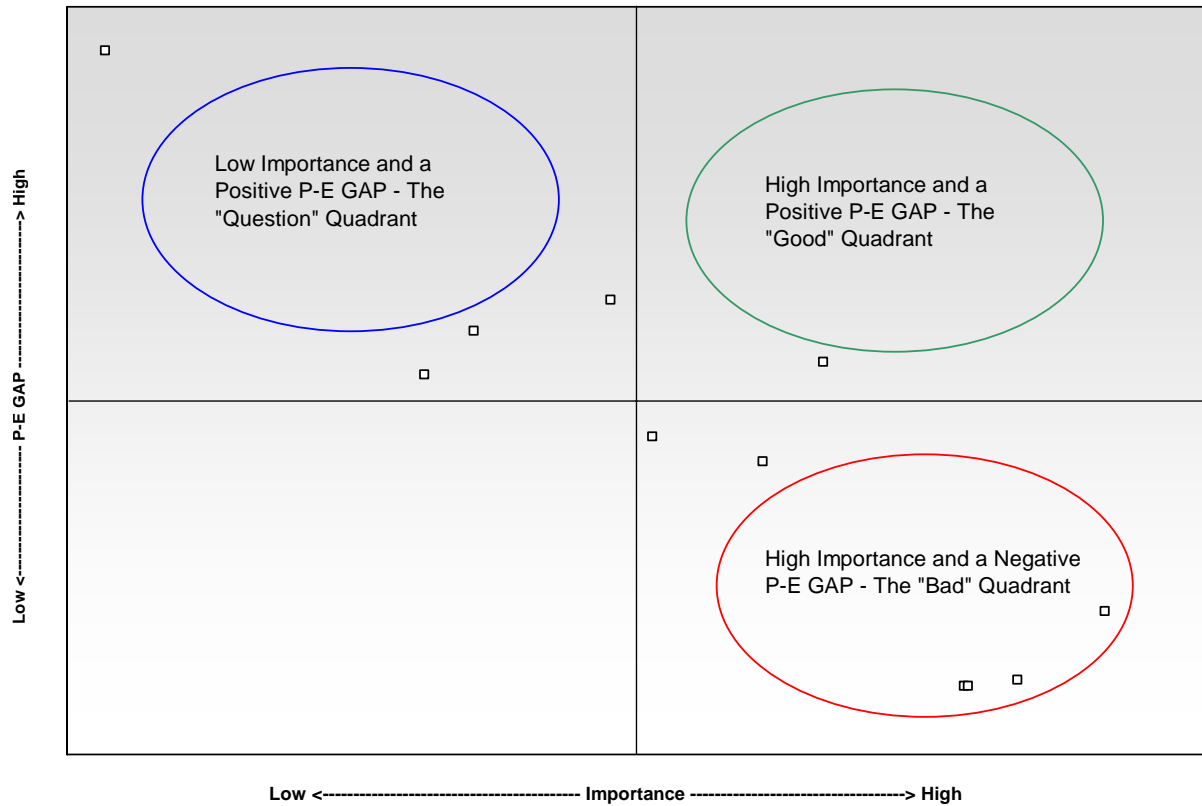
- A high [or positive direction] P-E GAP for an attribute is generally favorable and means that performance exceeds expectations [ $P > E$ ].
- On the other hand, a low [or negative direction] P-E GAP denotes performance as being below expectations [ $P < E$ ].

While these are informative results, a much more revealing interpretation takes place when attribute importance is considered.

Attributes that fall to the left of the vertical reference line are classified as those of “lesser importance” relative to those to the right of the line. This is not to say that they are unimportant.

The P-E Map used to represent the results of the GAP analysis does not form its basis on pure quadrant theory but is an extension of an earlier theory that involved "market acceptance" models that describe “cash cows” and “dogs” to segment products based on their market attractiveness and competitive positioning. Here we relate attractiveness to importance while the P-E GAP is a gauge of perceived market position. Such a display exposes attributes that have a high level of importance to the consumer, as defined by its mean rating, but have a low performance-to-expectation deviate (P-E GAP).

**Figure 1: P-E Map**



**Derived Importance**

Asking respondents to state the importance of product attributes can lead to results of many being equally important. To get a more accurate picture of what is truly important to users in choosing an Oligo Supplier, the respondents to this survey were asked to state how satisfied they were with select product features.

Bivariate correlation and regression analysis are common methods used to develop derived importance. In this case, since an estimate of brand equity is the desired outcome, regression analysis was used and from this an indexing scheme developed that allowed for rank ordering the results which created an indicator of brand equity.

## **Findings – Key Supplier Attributes**

Each respondent was asked to rate a series of attributes using a 7-point Likert scale ranging from a “low” rating to a “high” rating using the following questions:

**Previous studies have identified the following features as important to other life science researchers. When considering your Primary Supplier’s [noted in an earlier question] ability to provide oligos, how IMPORTANT to you are each of the following? (*Choose only one for each*)**

**How we *expect* a company to perform may differ from how they actually perform. How high or low are your EXPECTATIONS for each of these features when purchasing oligos from your Primary Supplier? (*Choose only one for each*)**

**As we mentioned in the previous question, how we expect a company to perform may differ from how they actually perform. How well is your Primary Supplier PERFORMING based on your experiences when purchasing oligos from this company? (*Choose only one for each*)**

The results are shown in Table 1 below.

The P-E GAP Table below displays the mean results for each measured attribute based on its importance to the respondent (I), the respondent's perception of their primary supplier's performance regarding that attribute (P) and then what the respondent expects of each attribute (E). The P-E column represents the difference, or "gap," between performance and expectation. Thus, a positive P-E indicates that the attributes performance is higher than expected, and visa versa.

For example, based on the 7-point Likert scale, the mean response for the perceived importance of "Accuracy of shipment" is 6.73; its mean expected value is 6.63 while it is performing at a mean rating of 6.41. Thus, the P-E GAP is -0.22 [6.41-6.63] which finds that accuracy of shipment is "under performing."

Of particular note is "value for price paid." The results show that the perceived "performance" of the price value being derived for the price being paid is lower than expected. That is, the price being paid is greater than the perceive value – underperforming.

Also noted in the table is the overall importance mean and P-E GAP which are used to determine the quadrants for interpretative purposes. The overall P-E GAP of 0.01 suggests that, generally, performance is just about at par with expectation.

**Table 1: P-E GAP Table**

I	Attribute	P	E	P-E
6.73	Accuracy of shipment	6.41	6.63	- 0.22
5.43	Customer service/support	5.75	5.47	0.28
5.99	Electronic ordering capabilities via Web site	6.13	5.95	0.18
5.83	Institute specific pricing offered	5.69	5.67	0.02
5.07	Oligo design expertise	5.68	5.45	0.23
6.36	Quality control procedures	6.03	6.37	- 0.34
6.50	Quality guarantee	6.11	6.44	- 0.33
4.10	Sales force	5.23	4.55	0.68
4.94	Same day delivery	5.39	5.23	0.16
5.54	Technical service/support	5.76	5.70	0.06
6.37	Timeliness of delivery	5.95	6.29	- 0.34
6.30	Value for price paid	5.99	6.19	- 0.20
5.76	Overall Means or P-E GAP	5.84	5.83	0.01

The GAP Map [Figure 2 below] is the pictorial representation of the above table with the P-E GAP on the vertical axis and importance on the horizontal axis. The four quadrants are based on the intersection of the overall importance mean and the P-E GAP, 5.76 and 0.01, respectively.

As seen, performance is lower than expected [a negative P-E GAP] for the following attributes that have higher than average importance:

- Timeliness of delivery [-0.34]
- Quality control procedures [-0.34]
- Quality guarantee [-0.33]
- Accuracy of shipment [-0.22]
- Value for price paid [-0.20].

Respondents are not getting what they expect from this set of above average important attributes.

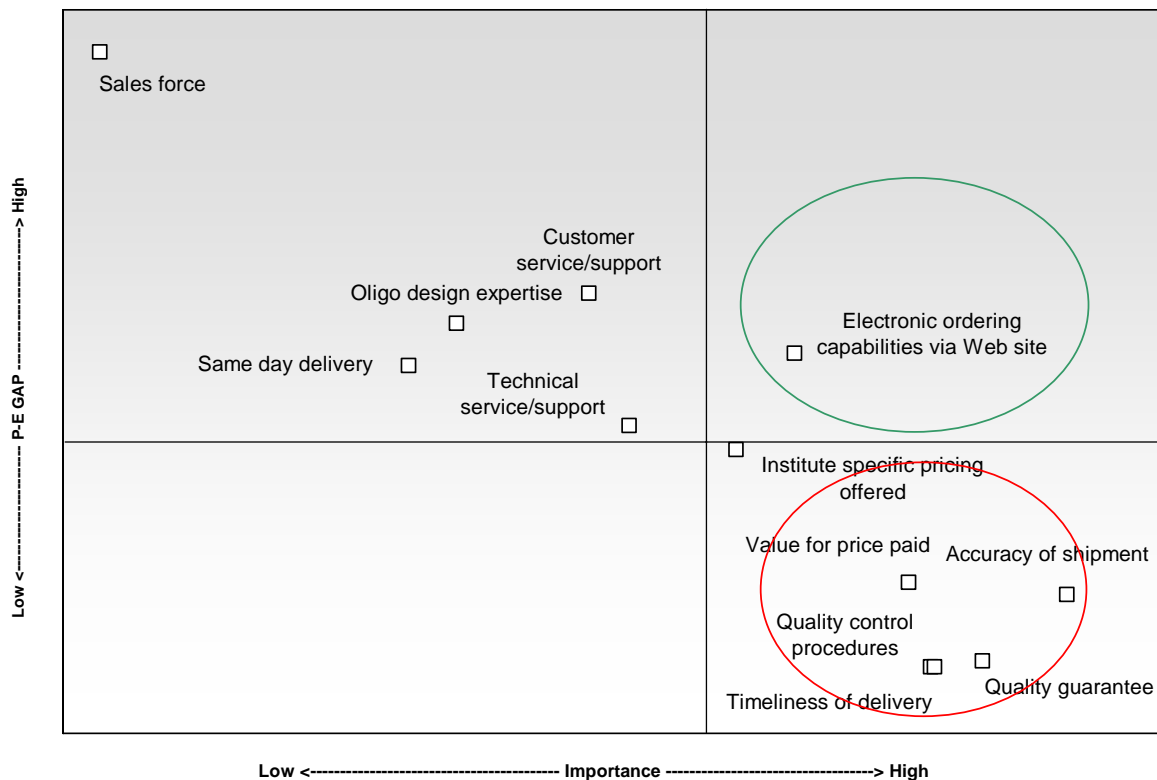
On the other hand, performance is higher than expected [a positive P-E GAP] for:

- Sales force (0.68)
- Customer service/support (0.28)
- Oligo design expertise (0.23)
- Same day delivery (0.16)

But, compared to several other attributes, these are relatively unimportant.

The only supplier attribute that is both deemed as being important and meeting the P-E Gap expectations is *Electronic ordering capabilities via the Web site*

**Figure 2: P-E GAP Map**



## **Findings – Brand Equity**

The process to help identify Brand Equity involved developing a relationship, a cause/affect or “key driver” model between a set of attributes and overall satisfaction based on a general linear regression model and replicated by Supplier.

The basis of this effort is the “assumption” that a respondent’s opinion for the individual attributes affects overall satisfaction with the Primary Supplier. That is, as a person’s opinion toward the attributes of a Supplier increase so does their overall level of satisfaction – more pronounced brand equity. Thus, an overall cause/affect model can be developed as well as individual models for each Supplier. When comparing the attributes Supplier-by-Supplier, the Supplier with the highest “overall rating” has the highest *brand equity*.

The results are presented in Table 2 [standardized regression or beta coefficients]. Table 3 presents the resulting indices to estimate brand equity.

**Table 2: Linear Regression, Beta Coefficients by Supplier**

Attributes	Overall Parameter Beta (n=1033)	Supplier				
		A (n=293)	B (n=281)	C (n=124)	D (n=78)	E (n=149)
Automation (e.g., bar coding)	0.143	0.165	0.256	0.170	0.073	0.374
Guaranteed minimum yields	0.112	0.104	0.128	0.104	-0.042	0.039
Guaranteed purification levels	0.140	0.127	0.131	0.064	0.281	0.062
Purification options available	0.059	0.059	0.040	0.126	0.071	0.097
QA/QC documentation	0.054	0.127	0.103	-0.126	-0.020	-0.098
Quality of raw materials	0.058	-0.001	-0.010	0.173	0.132	0.139
Large-scale synthesis offered	0.058	0.130	0.004	0.008	-0.072	-0.053
Range of synthesis scales offered	0.073	0.095	0.039	-0.023	0.131	0.222
Variety of formats offered (e.g., tubes, plates)	0.099	0.096	0.135	0.243	-0.035	0.162
Variety of modifications offered	0.079	0.054	0.007	-0.043	0.222	0.182

The Brand Equity Indices were derived using the overall model's result [beta coefficients by attribute] as the basis, and then comparing each Supplier, by attribute, to that base: The indices are the ratio between each attribute's beta within each Supplier and the overall beta for that attribute. For example, in Table 2 for attribute "Automation," the overall beta coefficient is 0.143 and for Supplier A the beta is 0.165 giving an index of 1.149 [0.165 / 0.143]. Comparing this result to that of Supplier E's index suggests that Automation is much more of a consideration to overall satisfaction among respondents who use Supplier E [index of 2.605] more often than for the responding group overall than do users of Supplier A. On the other hand, this attribute is less "important" to Supplier D users with an index of 0.509.

Once all indices are derived, the sum should give a composite indicator [overall rating] of brand equity. These rank ordering are found at the bottom of Table 24.

**Table 3: Index Table by Supplier**

Attributes	Supplier				
	A (n=293)	B (n=281)	C (n=124)	D (n=78)	E (n=149)
Automation (e.g., bar coding)	1.149	1.787	1.185	0.509	2.605
Guaranteed minimum yields	0.921	1.142	0.927	-0.375	0.343
Guaranteed purification levels	0.911	0.935	0.458	2.006	0.440
Purification options available	0.995	0.672	2.124	1.190	1.639
QA/QC documentation	2.328	1.884	-2.314	-0.373	-1.807
Quality of raw materials	-0.013	-0.169	2.993	2.283	2.407
Large-scale synthesis offered	2.222	0.074	0.130	-1.232	-0.914
Range of synthesis scales offered	1.312	0.531	-0.323	1.802	3.057
Variety of formats offered (e.g., tubes, plates)	0.969	1.363	2.457	-0.358	1.640
Variety of modifications offered	0.677	0.084	-0.541	2.802	2.299
<b>Index Sum</b>	<b>11.471</b>	<b>8.303</b>	<b>7.096</b>	<b>8.254</b>	<b>11.709</b>

The following graphic shows the Supplier positions. The findings suggests that, while overall satisfaction might be high, and indication of brand equity has more to do with the cumulative affect of the attributes that are significant.

Though Supplier B has the highest overall satisfaction rating, its brand equity index [8.303] under this model's scenario is less than Supplier A [11.471] and Supplier E [11.709].

**Figure 2: Brand Equity Map**

