

## Marketing a University-Affiliated Applied Research Center: Processes and Outcomes

Inquiries regarding the paper should be forwarded to the author at the following address:

Adee Athiyaman<sup>i</sup>  
Western Illinois University  
505 Stipes Hall  
1 University Circle  
Macomb, IL 61455

Tel. (309) 298-2272  
Fax. (309) 298-2142  
Email: A-Athiyaman@wiu.edu

## Marketing a University-Affiliated Applied Research Center: Processes and Outcomes

### Abstract

This paper demonstrates a market-segmentation and targeting methodology that would benefit business-to-business marketers. Specifically, the method highlights how published, secondary data can be used to construct an aggregate choice model for segmentation purposes. Then, it highlights how Hull-Spence behavioral theory can be employed to target the segments. An online experiment confirms the effectiveness of the approach in achieving communication objectives.

**Keywords:** Market Segmentation, Hull-Spence Behavioral Theory, Discrete Choice Model

### Introduction

In this age of strategic networks (Gulati, Nohria, and Zaheer, 2000), it has become common for universities to work with businesses on issues such as new product development, technology, and marketing (Fischer, 2009; Blumenstyk, 2010). The current status of university-industry partnerships in research can be gleaned from Table 1. As shown in the Table, R&D expenditures in universities and colleges, during the year 2008, amounted to \$51.9 billion. Of this, \$12.5 billion (24%) was spent on applied research. The average, annual, industry-contribution to applied research at universities works out to about \$3 billion (22%).

**TABLE 1. R&D expenditures at universities and colleges:  
2003–08 (Millions of Current Dollars)**

Source of funds and character of work	2003	2004	2005	2006	2007	2008
All R&D expenditures	40,100	43,258	45,799	47,751	49,554	51,909
Source of funds						
Federal						
Govt.	24,771	27,644	29,209	30,129	30,458	31,231
State and local						
Govt.	2,647	2,879	2,940	2,962	3,143	3,418
Industry	2,162	2,129	2,291	2,402	2,680	2,870
Institutional funds	7,664	7,753	8,266	9,062	9,748	10,435
Other	2,857	2,852	3,093	3,196	3,525	3,954
Type of work						
Basic research	30,121	31,968	34,368	36,096	37,842	39,408
Applied research	9,979	11,290	11,432	11,656	11,712	12,501

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Research and Development Expenditures at Universities and Colleges: FY 2008.

To cater to the research needs of the industry in Western Illinois, SE Iowa and NE Missouri (see Appendix 1 for a listing of the counties in the study area), a medium-size university in the Midwest has created an applied research center called I<sup>2</sup>. Specifically, the center aims to help businesses plan new products; gauge competitors' actions; penetrate new markets, and manage brand equity. This paper highlights the market segmentation and targeting activities of the center. One of the salient features of this research is the reliance on published, secondary data to construct I<sup>2</sup>'s marketing program. It is hoped that the methodology highlighted in the paper would be of interest to business-to-business (b2b) firms wanting to engage in market segmentation and targeting.

### Market Segmentation

Market segmentation is a strategy of resource allocation given a heterogeneous customer population (Kerin, Hartley, and Rudelius, 2009; Wedel and Kamakura, 2000). In the study area, we have a number of healthcare, government, retail, manufacturing, and hospitality businesses (Appendix 2). Since these businesses would be in different stages of their life cycle, their need for applied research would vary. For example, a start-up may like to "explore" the market potential for its new product whereas a mature firm may want to "confirm" the optimality of its marketing mix (cf. the Dorfman-Steiner theorem (Leeflang, Wittink, Wedel, and Naert 2000)).

It is also possible that the need for applied research could be latent or unfelt for some firms. Since creating primary demand for applied research is beyond the scope of I<sup>2</sup>, we focus on businesses that possess the need for applied research. Specifically, we assume that past research usage is the best predictor of current and future usage, and conceptualize firms that use research services as the potential market.

To segment the potential market, we utilize the argument that applied research requires extensive manager-researcher interaction (Deshpande and Zaltman 1984). This interaction is expected to cultivate in the manager an overall evaluation or attitude towards the research supplier (Gawronski and Bodebhausen, 2006). We label this attitude "supplier loyalty" and utilize it as the basis for segmenting existing users of research services.

To elaborate, supplier loyalty implies the strength of preference for a particular supplier (Wind and Thomas, 1994). If we segment existing research users into supplier-loyalty categories, then marketing efforts could be directed at research users who are likely to "switch" from their existing supplier and utilize research support from I<sup>2</sup>. More specifically, we define two groups of customers: brand loyal, and switchable. As the name implies, the brand loyal cluster would exhibit a higher probability of purchasing from their existing research supplier; most often a single supplier. In contrast, the switchable group would be utilizing two or more suppliers.

## Methodology

We calibrate a mathematical model to help us understand the customer's (firm) probability of research-supplier loyalty. Organizational variables are used as predictors and a disaggregate choice model is used to estimate one set of parameters for the population.

Data for the study was assembled in multiple stages. First, firms which provide management and technical consulting services (NAICS 5416) in the study area were identified from chamber-of-commerce web sites. Then, the websites of these "consulting" firms were searched to locate their clients. Finally, the "client-firms" websites were content-analyzed to construct indicators of organizational variables shown in Table 2.

**Table 2. Variables and their Operational Definitions**

Variable	Operational Definition
Firm Size	Ordinal variable coded 1 to represent small firms that have $\leq 5$ employees; 2 to capture medium businesses with 6 to 100 employees, and 3 for large firms with $> 100$ employees.
Work experience of the CEO	Number of years of experience in one or more industries.
Educational attainment	Highest qualification of firm personnel coded as follows: some college = 13 years of study; professional certificate = 15 years of study; bachelor's degree = 16 years; master's degree 17 years, and PhD = 20.
Management specialists	Number of accounting, management, and marketing specialists employed by the firm.
Technical specialists	Number of engineering and other technical personnel in the firm.
Geographical location of the firm	Nominal variable coded 1 to indicate counties in Illinois, 2 to represent counties in Iowa, and 3 to denote Missouri counties.
Supplier loyalty	Indicator or nominal variable to represent the number of research suppliers for the firm. Coded, 0 = 2 or more suppliers, and 1 = 1 supplier.

As mentioned earlier, the mathematical model that is presented in this paper is a stochastic model. The model assumes that a decision maker will select an option (for instance, a research

supplier) that she considers the most desirable. In line with terminology used in discrete choice theory, we posit that each decision maker ( $i = 1, 2, \dots, i$ ) has a “research-supplier” choice set  $\{C_i\}$  of size  $j_i$ . Let  $U_{ij}$  be the unobserved utility of supplier “j” to decision maker “i” which is posited to be some function of organizational variables  $\mathbf{x}_j$ . Mathematically:

$$U_{ij} = U(\mathbf{x}_j).$$

It is important to note that  $U_{ij}$  cannot be measured accurately because of problems such as omitted variables and measurement errors. Therefore, we assume that  $U_{ij}$  is made up of two elements: one deterministic,  $V_{ij}$  which is a function of  $\mathbf{x}_j$ , and another stochastic,  $e_{ij}$  which captures all misspecifications associated with the model. Formally,

$$U_{ij} = V_{ij} + e_{ij}$$

Where,  $V_{ij} = f(\mathbf{x}_j)$

We employ maximum likelihood procedures to assess the influence of  $\mathbf{x}_j$  on  $V_{ij}$ . In other words, the likelihood of the probabilistic model of the form  $V_{ij} = f(\mathbf{x}_j)$  should be maximized with respect to the parameters to obtain their estimates. The probability model is derived as follows.

Let  $P_{ij}$  = the probability that decision maker “i” chooses supplier-option “j” conditional on knowing each  $V_{ij} = A_j$  where  $A_j$  is some known value and  $j \in \{C_i\}$ . That is,

$$P_{ij} = \text{Prob}(U_{ij} > U_{ik} \mid V_{ij} = A_j, k \in \{C_i\}, \forall k \neq j)$$

For a binary choice situation, simple manipulations yield:

$$\begin{aligned} & \text{Prob}(U_{ij} > U_{ik}) \\ &= \text{Prob}(V_{ij} + e_{ij} > V_{ik} + e_{ik}) \\ &= \text{Prob}(e_{ij} - e_{ik} > V_{ik} - V_{ij}) \\ &= \text{Prob}(e_{ik} - e_{ij} < V_{ij} - V_{ik}) \end{aligned}$$

If we assume that the errors are distributed normally with mean “0” and variance  $\sigma^2$ , then

$$\text{Prob}(U_{ij} > U_{ik}) = \int_{V_{ij}-V_{ik}}^{\infty} \frac{1}{[(2\pi)^{1/2}\sigma]} \exp(-1/2 [(e_{ik} - e_{ij}) / \sigma]^2) \delta(e_{ik} - e_{ij})$$

which can be rewritten as:

$$\phi[(V_{ij} - V_{ik}) / \sigma]$$

where  $\phi[ ]$  denotes the standardized cumulative normal distribution.

We assume that  $V_{ij}$  are linear combinations:  $\beta' \mathbf{x}_j$ , where  $\beta'$  is a row vector of parameters.

This results in:  $\phi[(\beta' \mathbf{x}_{ij} - \beta' \mathbf{x}_{ik}) / \sigma]$

Again, assuming binary choice, the probability of decision maker “i” choosing supplier-option “k” can be obtained as follows:

$$\text{Prob}_{(ik)} = 1 - \phi [(\beta' (\mathbf{x}_{ij} - \mathbf{x}_{ik})) / \sigma]$$

The likelihood function for the probability model is:

$$L = \prod_n \phi \{[(\beta' (\mathbf{x}_{ij} - \mathbf{x}_{ik}))]^j \cdot \{1 - \phi (\beta' (\mathbf{x}_{ij} - \mathbf{x}_{ik}))\}^k\}$$

where, n = number of respondents, j = option 1 and k = option 2; j and k will take on a value of the supplier loyalty variable (see Table 2).

Simplifying using “ln” results in:

$$\sum_n (j) \ln [\phi (\beta' \mathbf{x})] + (k) \ln [1 - \phi (\beta' \mathbf{x})] \text{ where } \mathbf{x} = \mathbf{x}_{ij} - \mathbf{x}_{ik}$$

Then we find the maximum of “ln L” by differentiating with respect to  $\beta_s$  and setting the resulting derivatives to “0” to solve for  $\beta_s$ . Specifically,

$$\frac{\partial \ln L}{\partial \beta_i} = \sum_n j / [\phi (\beta' \mathbf{x})] \cdot [\delta \phi (\beta' \mathbf{x}) / \delta \beta_i] + k / [1 - \phi (\beta' \mathbf{x})] \cdot [\delta [1 - \phi (\beta' \mathbf{x})] / \delta \beta_i] = 0$$

$\delta \beta_i$  (refers to the “i<sup>th</sup>”  $\beta$ )

Note that the above Probit model is related to Logit based on the the property  $\beta_{\text{Logit}} = 1.7 \beta_{\text{Probit}}$  (Long, 1997). The Central Limit Theorem justifies the use of Probit in this paper since the number of observations employed to calibrate the model totals 184.

## Results

The Internet search identified 647 users of research services; the client-firms for the 28 research firms in the study area (Appendix 3). A statistical clustering of the client-firms’ NAICS codes using the agglomerative Ward’s method resulted in three clusters: manufacturing businesses (18% of the firms), service businesses (55%), and 27% “mixed” tourism businesses, that is producers of goods and services consumed both by residents and visitors (Ryan and Page, 2000).

However, not all businesses in these clusters had web presence. For instance, a financial service firm in Clinton, Iowa, and a manufacturing firm in Rock Island, IL, had no publicly-listed web sites. In all, 23 firms did not have publicly-listed web sites. Of the 624 businesses with web sites, only 184 provided information on all the variables of interest highlighted in Table 2. In terms of the three clusters discussed above, the 184 firms were distributed as follows: 14% manufacturing firms, 64% service firms, and the remaining 22%, mixed tourism firms.

Table 3 presents the descriptive statistics of the variables used in the choice model. Table 4 highlights the “partial” effects of each organizational variable on changes in the firms’ utility for supplier loyalty or technically, using only one research supplier.

**Table 3. Descriptive Statistics**

Variable	Level of Measurement	Descriptive Statistics
Firm Size	Ordinal	Median = 2; Range = 2
CEO's work experience (Yrs)	Ratio	Mean = 21; Std. Dev = 11.6
Educational attainment (Highest qualification of employees)	Ratio	Mean = 13; Std. Dev = 1.9
Management specialists	Ratio	Mean = 17; Std. Dev = 11.69
Technical specialists	Ratio	Mean = 11; Std. Dev = 2.59
Geographical location	Nominal	Mode = 1 (Illinois)

Consider the first variable in Table 4: the alternative specific constant. This variable has a value of "1" for supplier loyalty and "0" for usage of two or more research suppliers. The alternative-specific constant denotes the expectation or mean of  $e_{ik} - e_{ij}$ : that is, the utility of supplier loyalty from that of using two or more research suppliers, when all else is equal. In Table 4, the coefficient estimate for alternative-specific constant ( $\beta_o$ ) is 15.188. This reflects a relative preference for single research supplier.

Now consider the organizational variables in Table 4. If we assume that each of these variables has the same marginal utility for the two supplier-loyalty categories, then, all else being equal, the smaller the client-firm, the higher is its loyalty to the research supplier. The predictive power of the model is examined below:

$\ln L(0) = -126.846$ . This is the value of the log likelihood function when all the parameters are zero. Put simply, this is a naïve model in which the choice probabilities are assumed to be  $\frac{1}{2}$  for each of the two supplier loyalty categories.

$\ln L(c) = -58.828$  is the value of the log likelihood function when only an alternative specific constant is modeled. This process of modeling choice implies that the choice probability of supplier loyalty equals the fraction of the firms staying with one research supplier (.89).

$\ln L(\beta) = -1.83$  is the maximum value of the log likelihood function for the choice model we have formulated in Table 4.

$-2[\ln L(0) - \ln L(\beta)] = 250.032$  is a statistic used to test the null hypothesis that  $\beta_s = 0$ . It is asymptotically distributed as  $\chi^2$  with seven degrees of freedom. Since the value of  $\chi^2$  at seven degrees of freedom is 18.47, we can reject the null hypothesis at the 0.01 level.

$\rho^2$ , defined as  $1 - (\ln L(\beta) / \ln L(0))$  is similar to  $R^2$  used in regression. Here, its value is .96. This suggests that the model is a probable representation of reality, and that managerial implications can be deduced from the choice model.

**Table 4. Estimated Partial Effects of Organizational Variables on Supplier Loyalty**

Variable	Coefficient	Std. Error	Prob t >α
Alternative specific constant	15.188	5.6	.00
Firm size	-3.795	.961	.00
CEO's work experience	.041	.033	.22
Highest qualification of employees	-.196	.235	.40
Management specialists	.006	.525	.9
Technical specialists	-.552	1.004	.58
Geographical location	None of the categories were significant		

### Discussion

The differences between the probabilities of the two supplier loyalty categories were analyzed using statistical procedures given in Gensch (1984). The null hypothesis of no difference between the two probabilities was accepted for 42 firms (23%, Appendix 4). Put another way, these 42 firms are likely to “switch” research suppliers. Of these, 79% employ more than 100 people. This confirms the choice model’s prediction that large firms are likely to source research from more than one provider. How do we influence these firms to consider  $I^2$  for research service? Hull-Spence Behavioral Theory (HSBT) provides the guidelines (Rossiter and Foxall 2008).

We begin our marketing task with the assumption that the CEOs of the potential client-firms would be the decider and purchaser of research service. The variables that would initiate the desired behavior in the CEO, that is, commission  $I^2$  for applied research, include:

- (i) **Stimulus intensity dynamism:** It deals with the CEO’s internal response to the stimulus or cue that initiate behavior. The encoding specificity principle (Tulving, 1983) suggests that successful retrieval of brand name (for example,  $I^2$ ) depends on achieving a match between the information encoded at the time of learning and the information that is available at the time of retrieval. Often, CEOs in need of applied research (cue) would mentally recall one or more research supplier (Barnes Report, 2010). In other words, the retrieval of brand name would follow the cue → brand sequence. Therefore, marketing communications for  $I^2$  should associate category cue (for example, need to make better economic decisions) to  $I^2$  brand name and logo. Note that in marketing communications terminology, this procedure would be described as category-cue prompted brand name recall (brand awareness).
- (ii) **Generalized drive:** Generalized drive or arousal energizes the CEO to overtly respond or commission an applied research project. This arousal is dependent on a variety of highly intense “external” and “internal” stimuli. For example, economic recession, a stimulus in the external environment, coupled with a **strong** “internal” urge to beat the competition (need for achievement (McClelland et al 1953)), may drive the CEO to commission market research to better understand competition. This task may be assigned to the supplier that the CEO has dealt with before. Stated differently, the



target market will form a preference for a “new brand” only at a low drive level; high drive favors use of previously used research supplier(s). Hence, it is essential to ensure that marketing communications from  $I^2$  doesn't arouse the CEO too much: a low-arousal stimulus (for example, marketing communication) is needed to place  $I^2$  in the CEO's research-supplier consideration set (Lilien and Rangaswamy, 2004).

- (iii) **Habit strength:** Unlike generalized drive, habit strength is specific to a particular brand. This concept equates with the brand attitude concept discussed by Rossiter and Percy (1997). Brand attitude is defined as the buyer's evaluation of the brand with respect to its perceived ability to meet a currently relevant motivation (East, 1997). To elicit positive attitude towards  $I^2$ , we focus on the set of benefits thought to be important, deliverable, and unique for  $I^2$  (Rossiter and Percy, 1997). Deshpande and Zaltman (1984) posit that managers consider “technical quality of research” to be a salient determinant of satisfaction with the research provider. This expectation can easily be met by  $I^2$  since its researchers have expertise in business and economic research. As regards the uniqueness of  $I^2$ , it is its association with the Midwest university that differentiates it from the rest of the consulting firms.
- (iv) **Incentive motivation:** This concept denotes the anticipated reinforcement or punishment for engaging in an act or behavior. Incentive motivation is often conceptualized as an antecedent to habit strength. For example, functioning in turbulent economic times may result in the CEO learning that the research-support activities of  $I^2$  could help succeed in difficult economic times. To create this learning among the client firms,  $I^2$  should broadcast a message such as the one given below:
 

“Your business or organization needs to make optimal decisions during turbulent times. We provide tailor-made solutions to your business and economic development needs”.
- (v) **Reaction potential:** Also called behavioral intention (Fishbein and Ajzen, 1975), this variable alerts us to plausible “inhibitors” of behavior that may prevent the CEO from commissioning  $I^2$  to conduct research. As an example, consider the scenario where the CEO, after receiving and browsing through a number of direct mail advertisements, develops fatigue while reading them and eventually experience “mental tiredness” as soon as she receives another piece of direct mail. In this situation, sending an  $I^2$  brochure by mail to the CEO will result in  $I^2$  being ignored by the CEO. The point is that steps should be taken to safeguard against these conditioned inhibitions.

In summary, the principles of HSBT suggest the following tactics for marketing  $I^2$  (Table 5):

- (1) Brand awareness is based on category-cue prompted brand name recall, therefore associate organizations' need to make better business decisions with  $I^2$  brand name and logo.

- (2) Print advertisements for  $I^2$  should be constructed and placed in a manner that creates low arousal level for the audience. Extant research in consumer behavior suggests that blue color in the environment elicits low-arousal levels in subjects (Bellizi and Hite 2006). Hence, an  $I^2$  brochure should be designed with a blue background. Next, based on the reasoning that email generates low arousal than snail mail (Hanna, Weinberg, Dant, and Berger 2006; also see discussions about reaction potential above), the brochure should be emailed to potential clients.
- (3) Create positive attitude towards  $I^2$  by highlighting the quality of its product, the skills of its researchers, and its “unique” association with the university. Again, the  $I^2$  brochure should highlight the type and quality of its products, the methodological skills of its researchers, and includes the logos of the university to demonstrate that it is part of these organizations.

**Table 5. Marketing Tactics for  $I^2$**

<b>HSBT Variable and Definition</b>	<b>Postulate / Principle</b>	<b>Implication for <math>I^2</math></b>
Stimulus intensity dynamism: Subject's internal response to the stimulus that initiates behavior.	Successful retrieval of brand name depends on achieving a match between the information encoded at the time of learning and the information that is available at the time of retrieval.	Associate the category cue, “need to make better business decisions” with $I^2$ brand name and logo.
Generalized drive: Enables the subject to consider the purchase of a brand.	High drive favors consideration of previously used brand.	Create an $I^2$ sales brochure using blue color. Then email the brochure to potential clients.
Habit strength: Overall evaluation of a brand (brand attitude).	To create brand attitude, focus on the set of benefits thought to be important, deliverable, and unique for the brand.	Highlight the technical quality of research conducted by $I^2$ . Also, emphasize its associations with the university.
Incentive motivation: Anticipated reinforcement or punishment for engaging in an act or behavior.	For high risk or high cost purchases, highlight the link between the customer's emotion and the brand.	Advertisements should state that businesses operating in turbulent environments need $I^2$ 's market intelligence to succeed in the marketplace.

Reaction potential: Subject's intention to engage in an act.	Purchase inhibition could nullify the relationship between intention and behavior.	Do not mail the I <sup>2</sup> brochure to clients: conditioned fatigue to direct mail may influence the CEO to ignore the brochure.
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### Implementation

During the week of April 12, 2010, the brochure shown in Appendix 5 was emailed to all of the 42 firms categorized by the choice model as “switchers” (Appendix 4). Furthermore, in order to demonstrate the superiority of the segmentation methodology employed in the paper, a random sample of 42 “supplier loyal” firms were also emailed a brochure (Appendix 6). An email inviting the firms to explore the I<sup>2</sup> web site resulted in the responses given in Table 6.

**Table 6. Website Browsing Behavior of Switchers and Loyals: Measured the Day after the I<sup>2</sup> Brochure was E-mailed out to the Segments**

Variable	Definition	Browsing Behavior	
		Switchers	Loyals
Visits	Number of unique visitors to the website	23	5
Page views number	The number of pages that were requested in all visits	21.5	8
Time on site	Average number of minutes people stayed on the website	3 minutes	.5

Note that the I<sup>2</sup> website is predominantly a news website: it provides content such as working papers to inform managers about business-research applications. Hence, the performance indicators given in Table 6 are relevant measures for the “information” objective. They show how effective our segmentation and targeting approach is. In addition, we received email inquiries from two businesses, classified as switchers, wanting to explore the benefits of working on applied research projects with I<sup>2</sup>.

### Conclusion

This paper demonstrates how the Internet can be used to assemble data relevant for industrial or b2b marketing. A major benefit of the segmentation methodology employed in the paper is that it requires no primary data. It took approximately 50 hours to trawl the web sites of interest and construct the data matrix. It is hoped that this low-cost methodology to customer targeting would help small and medium businesses to maximize the effectiveness of their marketing programs.

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**Appendix 1: Study Area**

<u>State</u>	<u>County</u>
Illinois	Adams
	Fulton
	Henry
	Knox
	Lee
	McDonough
	Peoria
	Pike
	Rock Island
	Warren
	Whiteside
Iowa	Clinton
	Des Moines
	Lee
	Muscatine
	Scott
Missouri	Lewis
	Marion
	Pike

## Appendix 2: Industries and Establishments in the Study Area

<u>NAICS Code</u>	<u>Description</u>	<u>2008 Establishments</u>
11	Agriculture, forestry, fishing and hunting	211
21	Mining	31
22	Utilities	51
23	Construction	1,946
31-33	Manufacturing	918
42	Wholesale trade	1,284
44-45	Retail trade	2,401
48-49	Transportation and warehousing	1,303
51	Information	284
52	Finance and insurance	1,097
53	Real estate and rental and leasing	593
54	Professional and technical services	1,438
55	Management of companies and enterprises	60
56	Administrative and waste services	865
61	Educational services	134
62	Health care and social assistance	1,443
71	Arts, entertainment, and recreation	276
72	Accommodation and food services	1,619
81	Other services, except public administration	1,801
90	Government	3,911

**Source:** EMSI Data - 1st Quarter 2010

### Appendix 3: Research Firms in the Study Area and Sources of Intelligence about Them

Research Firm	Source of Information
F.A.C. Marketing	<a href="http://growburlington.com">http://growburlington.com</a>
Poole Advertising	<a href="http://www.hannibalchamber.org">http://www.hannibalchamber.org</a>
Nehlsen Communications	<a href="http://www.iowaqcchamber.com/">http://www.iowaqcchamber.com/</a>
Adesign, Inc	<a href="http://www.iowaqcchamber.com/">http://www.iowaqcchamber.com/</a>
Vernon Research Group	<a href="http://www.iowaqcchamber.com/">http://www.iowaqcchamber.com/</a>
Mission Creative	<a href="http://www.iowaqcchamber.com/">http://www.iowaqcchamber.com/</a>
One Stop Marketing	<a href="http://www.morrisonchamber.com">http://www.morrisonchamber.com</a>
Central States Media	<a href="http://www.peoriachamber.org">http://www.peoriachamber.org</a>
Clark Marketing	<a href="http://www.peoriachamber.org">http://www.peoriachamber.org</a>
Converse Marketing	<a href="http://www.peoriachamber.org">http://www.peoriachamber.org</a>
DLA Creative	<a href="http://www.peoriachamber.org">http://www.peoriachamber.org</a>
Kennard Communications	<a href="http://www.peoriachamber.org">http://www.peoriachamber.org</a>
LMA Consulting	<a href="http://www.peoriachamber.org">http://www.peoriachamber.org</a>
Pudik	<a href="http://www.peoriachamber.org">http://www.peoriachamber.org</a>
RSM McGladrey	<a href="http://www.peoriachamber.org">http://www.peoriachamber.org</a>
Simantel	<a href="http://www.peoriachamber.org">http://www.peoriachamber.org</a>
Deverman Advertising, Inc.	<a href="http://www.peoriachamber.org">http://www.peoriachamber.org</a>
McDaniels Marketing Communications	<a href="http://www.peoriachamber.org">http://www.peoriachamber.org</a>
Business Builders	<a href="http://www.peoriachamber.org">http://www.peoriachamber.org</a>
AdForce	<a href="http://www.quincychamber.org/">http://www.quincychamber.org/</a>
Lusage Marketing	<a href="http://www.quincychamber.org/">http://www.quincychamber.org/</a>
Media Development of Quincy, Inc	<a href="http://www.quincychamber.org/">http://www.quincychamber.org/</a>
Reed Promotional Media	<a href="http://www.quincychamber.org/">http://www.quincychamber.org/</a>
Rokusek Design, Inc	<a href="http://www.quincychamber.org/">http://www.quincychamber.org/</a>
Group O	<a href="http://www.quadcychamber.com">www.quadcychamber.com</a>
Hanson Watson Associates	<a href="http://www.quadcychamber.com">www.quadcychamber.com</a>
Media Link, Inc	<a href="http://www.quadcychamber.com">www.quadcychamber.com</a>
Silver Oaks	<a href="http://www.quadcychamber.com">www.quadcychamber.com</a>
Valpak Direct Marketing	<a href="http://www.quadcychamber.com">www.quadcychamber.com</a>
Results Integrated Marketing	<a href="http://www.quadcychamber.com">www.quadcychamber.com</a>
The Ad Group	<a href="http://www.quadcychamber.com">www.quadcychamber.com</a>



#### Appendix 4. Firms that could “Switch” Research Suppliers

Firm	Prob. $SL_1$	Prob. $SL_0$	z score ( $H_0: SL_1=SL_0$ )
Access	0.92887	0.07113	1.21321075
Sourcing & Supply	0.58644	0.41356	0.244526167
Rco	0.71206	0.28794	0.599886846
B Construction	0.87243	0.12757	1.053550212
B Hospital	0.62778	0.37222	0.361471004
Eye Associates	0.92887	0.07113	1.21321075
B Mortgage	0.92887	0.07113	1.21321075
Pillar	0.57933	0.42067	0.224413013
Kitchens	0.92887	0.07113	1.21321075
Chemical, Inc	0.58237	0.41763	0.23301273
Stone	0.62778	0.37222	0.361471004
Edge	0.58644	0.41356	0.244526167
C College	0.62778	0.37222	0.361471004
P Schools	0.87243	0.12757	1.053550212
R Hospital	0.87243	0.12757	1.053550212
Administration	0.67013	0.32987	0.481272984
Earth	0.92887	0.07113	1.21321075
H Bank	0.50544	0.49456	0.015388967
H Racing	0.92887	0.07113	1.21321075
IT	0.92887	0.07113	1.21321075
C College	0.58644	0.41356	0.244526167
Contracting Company, Inc	0.68242	0.31758	0.516039604
TV Station	0.33895	0.66105	-0.455586987
Savings Bank	0.62778	0.37222	0.361471004
Restaurants, Inc	0.58237	0.41763	0.23301273
Medical Center	0.57933	0.42067	0.224413013
Transit	0.47097	0.52903	-0.082121641
Bank	0.68242	0.31758	0.516039604
College	0.57933	0.42067	0.224413013
Baseball	0.57933	0.42067	0.224413013
Civic Center	0.43057	0.56943	-0.196407355
County Hospital	0.87243	0.12757	1.053550212
City Mallards	0.68242	0.31758	0.516039604
Elementary Schools	0.62778	0.37222	0.361471004
Development	0.68242	0.31758	0.516039604
Lene's	0.92887	0.07113	1.21321075
S Group	0.58237	0.41763	0.23301273
S Communications	0.62778	0.37222	0.361471004

Partnership	0.57933	0.42067	0.224413013
Cable	0.87243	0.12757	1.053550212
Union	0.62778	0.37222	0.361471004
Radio station	0.58644	0.41356	0.244526167

**Note:** For confidentiality purposes, only part of the firm-name is listed.

$SL_i$  = Supplier loyalty categories as defined in Table 2;

Type 1 error rate for the statistical test was set at  $\alpha = 0.10$ ; Critical  $z = 1.28$

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## Appendix 5: The I<sup>2</sup> Brochure



Your business or organization needs to make optimal decisions during turbulent times. We provide **tailor-made solutions** to your business and economic development needs.

### Comprehensive Research Services:

#### STRATEGY

Strategy decisions involve allocating resources over time. We utilize tools such as shared experience models, portfolio models, and the Analytic Hierarchy Process to structure and facilitate resource allocations.

#### COMPETITION

Our competitive analysis toolkit includes:

1. Industrial organization models;
2. Game theory; and
3. Reaction matrices

#### NEW PRODUCT MODELS

- Models for identifying opportunities
- Models for product design
- Models for new product sales forecasting

#### MARKETING COMMUNICATIONS

We will prescribe the best way to expose the target audience to a message the desired number of times and to schedule those exposures over a time period.

Are you identifying and capitalizing on upcoming opportunities? Is your business strategy in alignment with your stakeholders needs?

**Gathering, Understanding, and Using Market Information is Crucial for Effective Decisions**

#### LOCATION DECISIONS

Our decision models combine gravity model with probability mechanisms which enable scenario planning. We help choose a market area in which to establish an outlet, and then choose a specific site within that location.

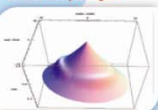
#### PRICING

Setting prices based on cost, demand, or competition; tactics to influence reference price; price discrimination; and aggregate models to analyze sales promotions.

#### ECONOMIC DEVELOPMENT

Input-output analyses to assess economic impacts of policy including employment forecasts. Land-use and transportation models to assess economic, social, and ecological impacts of transportation projects.

#### Location Theory Intelligence



Product portfolio models for strategic decision making.

Demand analyses using time series and econometric models.

Choice models to predict the likelihood of visiting / patronizing your community / business.

Market share forecasts using joint-space mapping methods.

Perceptual mapping to analyze competition.

#### Business & Economic Intelligence



### Appendix 6: Supplier-Loyal Firms

<b>Firm</b>	<b>Prob. SL<sub>1</sub></b>	<b>Prob. SL<sub>0</sub></b>	<b>z score (H<sub>0</sub>: SL<sub>1</sub>=SL<sub>0</sub>)</b>
Insurance Agency, Inc.	1	0	1.414427157
National	0.67013	0.32987	0.481272984
Diagnostics	0.97848	0.02152	1.353550212
Technology Services	0.97114	0.02886	1.332786421
Education	0.99672	0.00328	1.405148515
Zales	0.99951	0.00049	1.413041018
Dental Care	0.98685	0.01315	1.377227723
Diocese of Peoria	0.97848	0.02152	1.353550212
Construction	0.99964	0.00036	1.413408769
Chamber of Commerce	1	0	1.414427157
Engineering Corporation	0.98685	0.01315	1.377227723
Ice Cream	0.97108	0.02892	1.33261669
Jewelry	0.99672	0.00328	1.405148515
Wear	1	0	1.414427157
Downtown	0.99902	0.00098	1.41165488
Orchards	0.99902	0.00098	1.41165488
Consulting LLC	0.99951	0.00049	1.413041018
Builders	0.95801	0.04199	1.295643564
Greg	0.99828	0.00172	1.409561528
Clinic	0.99099	0.00901	1.38893918
Rehabilitation Center	0.99672	0.00328	1.405148515
Illinois Institute	0.97848	0.02152	1.353550212
Plastic Surgery	0.97848	0.02152	1.353550212
Funeral Home	0.99672	0.00328	1.405148515
M Originals	0.99993	7E-05	1.414229137
Painting & Decorating	0.98685	0.01315	1.377227723
Dental Associates	1	0	1.414427157
Museum	0.99672	0.00328	1.405148515
Credit Union	0.95801	0.04199	1.295643564
Surgery	0.99672	0.00328	1.405148515
P Foundation	0.99933	0.00067	1.412531825
P Orchestra	0.98176	0.01824	1.362828854
QC Connection	0.98965	0.01035	1.385148515
Bank & Trust	1	0	1.414427157
Gallery	0.98685	0.01315	1.377227723
Printer	0.999	0.001	1.411598303
Florist	0.99976	0.00024	1.413748232
Taste of H	0.99672	0.00328	1.405148515

The Doctors	0.9844	0.0156	1.37029703
Car dealership	0.99724	0.00276	1.406619519
Twain	0.99672	0.00328	1.405148515
Corners	0.98965	0.01035	1.385148515

**Note:** For confidentiality purposes, only part of the firm-name is listed.

$SL_i$  = Supplier loyalty categories as defined in Table 2;

Type 1 error rate for the statistical test was set at  $\alpha = 0.10$ ; Critical  $z = 1.28$

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<sup>i</sup> Thanks to Randy Sherwood for help with data collection.