

# **CUSTOMER INSIGHTS FOR COMMUNITY-ECONOMIC-DEVELOPMENT AGENCIES (EDAs): THE TIME SERIES BEHAVIOR OF PROGRAMS**

**Adee Athiyaman, Western Illinois University**

## **ABSTRACT**

*EDAs produce a variety of products and not all products need to generate profits; some of them may be produced for the good of society at large. However, in many cases EDAs do seek return on their investments. The market-selection method presented in this paper should be considered an investment in future profitability.*

*Keywords: Business Planning, Community Economic Development, Marketing, Market Selection, Sine Function.*

## **INTRODUCTION**

This paper is built on the premise that government units should adopt marketing approaches to meet mandates and satisfy client needs in the present day, diminishing-resources environment. In line with (Varadarajan, 2009), we define marketing approaches as customer-satisfaction focused behavior of firms. Examples of market-focused behavior include target market choices, creating product(s) which offer value to customers in exchanges, etc. Note that the marketing approach aims to achieve optimum relationships between the organization and its environment (Litten, 1980; White & Hammermesh, 1981).

Critiques of the marketing approach tend to argue that it is inappropriate to run government like business (Litten, 1980). We believe that this competes with the view that government needs to be more responsive to the needs of the public and that marketing may help governments accomplish this goal (Wilkie & Moore, 2007). Indeed, Osborne and Gaebler (1993) observe that

Democratic governments exist to serve their citizens. Businesses exist to make profits. And yet it is business that searches obsessively for new ways to please the people. Most governments are customer-blind, while McDonald's and Frito-Lay are customer-driven. This may be the ultimate indictment of bureaucratic government.

And for the argument that governments should not be in competition with the private sector (Copulos, 1977), it is essential to note that government is definitely not a business, but is an institution charged primarily with serving the public interest and that, in many cases, it can do this more effectively by employing a marketing approach (Kotler & Drucker, 1993),

To demonstrate the usefulness of marketing approaches to community development organizations, this paper utilizes a case study approach. Specifically, it highlights how a government-funded EDA, which is the outgrowth of a need for an agency to monitor conditions in rural Illinois, can benefit from analyzing its past behavior to gain insights into target-market selection.

## LITERATURE REVIEW

Many EDAs offer products that can be directed at different end-use markets. For example, the EDA at the University of Illinois, University of Illinois Extension, offers educational services to small businesses, local governments, and residents (health education, for example). Since opportunities differ in different markets and the future of the EDA is tied to its markets, market selection is a crucial consideration in business planning (Rossiter & Percy, 1996).

In marketing, market selection is often based on classifying purchasers as heavy and light users. Since heavy users generate the most revenue for the business, marketing efforts such as advertising are focused on heavy users, the primary target audience (East, Malcolm & Vanhuele, 2008).

Statistical approaches that are employed to categorize users and profile them include group comparison procedures, and cluster analysis (Lilien & Rangaswamy, 2004). The group comparison procedure utilizes median split of product-usage statistics to gain insights into the attitudinal / psychographic differences between heavy and light users (see for example, Lantz, 1995). For cluster analysis, the focus is on exploration. Specifically, respondents' scores on a number of profile variables such as personality measures are subjected to (dis)similarity analysis and the resulting pattern examined to understand differences between heavy and light users (Dillon & Goldstein, 1984). Note the *a priori* assumption in cluster analysis that heavy and light users would differ on profile variables; a questionable assumption given conflicting findings in the extant literature (Hackleman & Duker, 1980; Morgan, 1979).

To understand the methods of market selection used in EDAs, a search for relevant academic and practitioners' publications was conducted. As shown in Table 1, of the 120 hits in the *Community Development Journal*, only six articles contained "marketing" related discussions (Abucar, 1995; Cearbhaill & Cinnéide, 1986; Cossio & Winder, 1985; Hafner, 1995; Hodge, 1996; and Jones, 1967). However, none of these articles / reviews pertains to target-market selection. For example, Abucar (1995) highlights community development efforts in a Canadian region heavily dependent on producing and marketing natural resources. Similarly, Jones (1967)

discusses marketing within the context of changing needs for agricultural products. As regards practitioner publications, a Google search for “regional economic consulting” produced 22, 400 results. The results page had one ad for the firm Quant Economics, Inc. ([www.quanteconomics.com](http://www.quanteconomics.com)). Based on the belief that the advertising firm should have expertise in helping EDAs choose target markets, we explored their website for copies of white papers on the topic. While no publication could be found, the firm does claim expertise in market analytics such as pricing, and demographic analysis. Finally, a random pick of an economic-development consulting firm from the Google-search results lead us to ICF International’s web page ([www.icfi.com](http://www.icfi.com)). Again, no publication on market selection was found (Table 1).

In summary, little or no publication on market selection strategies for EDAs could be found. However, as mentioned earlier, for survival in the marketplace, it is essential that EDAs optimize their programming. This paper utilizes empirical models to derive norms for programming decision making.

**Table 1: Results of Literature Search**

Source	Keywords	Search Period / date	# of Hits	Comments
Community Development Journal, Oxford University Press	Market selection (searched in text / abstract/ title)	Jan. 1996 – Jan 2011	120	The search resulted in articles that had little or no relevance for target market selection. <a href="http://cdj.oxfordjournals.org/">http://cdj.oxfordjournals.org/</a>
Community Development: Journal of the Community Development Society, Routledge	Market selection (“all words”, and “all fields” search)	Issue 1, 1978 to Issue 1, 2011	0	The search was initiated through “informaworld” ( <a href="http://www.informaworld.com">http://www.informaworld.com</a> )
Economic Development Quarterly, Sage Publications	Market selection (“all words”, and “all fields” search)	Feb. 1987 to Feb. 2011	98	The search resulted in articles that had little or no relevance for target market selection. <a href="http://edq.sagepub.com/">http://edq.sagepub.com/</a>
Google.com	“regional economic consulting”	February 16, 2011	22, 400	When the search was restricted to the US, 17, 000 hits were obtained. The advertising on the results page was explored for market selection related publications (see text above).
ICF International ( <a href="http://www.icfi.com">www.icfi.com</a> )	Market selection	February 16, 2011	1	Claims to have expertise in researching markets for energy-efficient products; no publications on market selection was found.

## THE SETTING

In 1986, a Task Force on the Future of Rural Illinois conducted a set of 25 public hearings and one of the outcomes was a need for a permanent agency to study rural issues and to identify potential remedies. In 1989, the focal EDA was created as a companion agency to the Governors Rural Affairs Council. Since then, the agency has obtained and utilized \$41.8MIL to improve the quality of life for rural residents.

Table 2 highlights some of the activity and capacity measures of the agency for the 2009 time period. It also shows the annual compound growth rate of the metrics during the past three years starting 2007. As shown in the table, the agency's financial capacity (budget) has declined during the 2007-2009 time period. The same is true for the institute's community-development activities. However, not all capacity measures pose a declining trend. The agency's human resources (number of full-time employees) registered a positive growth rate during the three-year time period.

Table 2: Capacity and Activity Metrics – Focal EDA, 2009			
Category	Performance Metric	Value	Annual Compound Growth Rate (2007-2009)
Capacity Measures: Indicates the institute's ability to get things done	No. of full-time faculty	37	0.03
	& staff Budget	\$3.57 MIL	-0.07
Activity Measures: Measures progress toward the goals that drive the institute's behavior	Community-development programs	24	-0.28
	Training programs	90	-0.12

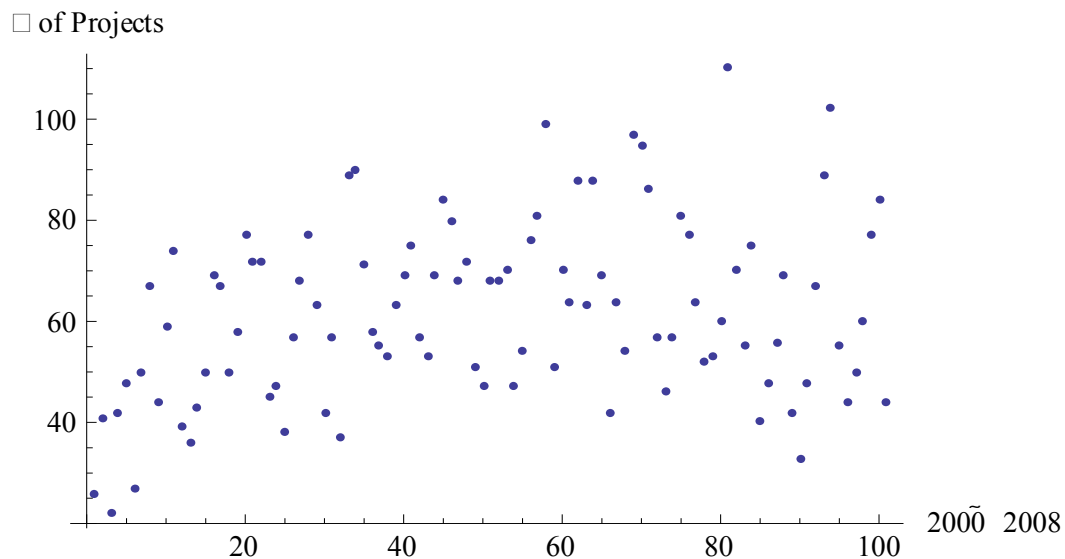
It is easy to dismiss the decline in financial capacity and programming activities as signs of uncertain economic times; and hope that marketplace would drive reversion to mean performance in the coming years. However, this “just play along” strategy can erode the agency's positional advantage; the incumbent advantage in the community-economic-development marketplace in Illinois.

The need to be robust and responsive to changes in the marketplace raises the question of where to compete. In fact, extant research suggests that 80% of (revenue) growth is explained by choices about where to compete, leaving only 20% explained by choices about how to compete (see for example, Bahadir, Bharadwaj & Parzen, 2005).

In the following pages, we address the “where to compete” question using a data driven approach. Because the evolution of markets is path dependent (Cohendet and Steinmueller, 2000) – that is, the current state in any one time is the sum product of all previous events, including random ones, we model the time series behavior of the focal EDA's programs to predict places (counties) to compete in the coming years.

Consider Figure 1. It is a list plot of the agency's programs implemented during the 2000-2008 time period. To better understand this wave-like pattern of demand for the programs, we utilize the sine function (Gartner & Halbherr, 2004).

**Figure 1: Scatter Plot of the EDA's Programs: Monthly Data for 2000-2008**



### THE MODEL

As mentioned earlier, we hypothesize that the time pattern of EDA programming to be:

$$PD_t = f(\sin(t)) \quad (1)$$

where,  $PD_t$  = Demand for EDA programs during month  $t$ .

We operationalize equation 1 using the following formulation:

$$PD_t = a_1 + a_2 t + a_3 \sin\left[\frac{a_4 + t}{a_5}\right] + \epsilon_t \quad (2)$$

The parameters in equation 2 have the following interpretation:

- $a_1$  = Constant term;
- $a_2$  = Secular trend;

$a_3$  = Amplitude of the sine wave;  
 $a_4$  = Displacement of the sine curve relative to the time origin;  $\sin(-a_4) = 0$ .

The parameter  $a_4$  is unique up to an additive factor of  $n \cdot \pi$ .  $a_5$ . If  $n$  is odd, then  $a_3$  changes signs.

$a_5$  = Period of the wave; a complete cycle of the sine wave requires  $2\pi \cdot a_5$  years.

Note that statistically significant parameters  $a_3$  to  $a_5$  would enable us to not only assess the fit of the prediction equation 2 with observed data, but also predict the timing of the peaks and troughs in programming. The latter would help the EDA target its marketing efforts during peaks to outgrow competitors.

Data for model calibration were obtained from the agency's management information system. In all 6720 observations, pertaining to program implementations for the years 2000-2008, were assembled. The reduced data matrix had 9 (years) x 12 (monthly) data points.

### MODEL CALIBRATION

The model (equation 2) was calibrated using nonlinear least squares. The presence of serially correlated errors, necessitated that  $\epsilon_t$  be specified as follows:

$$\rho\epsilon_{t-1} + u_t$$

where,  $u_t$  are independent and identically distributed with  $E(u_t) = 0$ , and  $V(u_t) = \sigma_u^2$  and

$$\rho = \frac{\sum_{t=2}^n \epsilon_t \epsilon_{t-1}}{\sum_{t=2}^n \epsilon_{t-1}^2}$$

The adjustment of equation 2 for correlated errors results in:

$$\begin{aligned}
 & PD_t - \rho PD_{t-1} \\
 = & a_1 + a_2 t + a_3 \sin \left[ \frac{a_4 + t}{a_5} \right] + \epsilon_t \\
 & - \rho \left[ a_1 + a_2 (t-1) + a_3 \sin \left[ \frac{a_4 + (t-1)}{a_5} \right] + \epsilon_{t-1} \right]
 \end{aligned}$$

This revised equation was calibrated using the 9x12 data matrix shown in Table 3, where rows = years and columns = months.

<b>Table 3: Data Matrix</b>											
?	?	?	?	?	?	26	41	22	42	48	27
50	67	44	59	74	39	36	43	50	69	67	50
58	77	72	72	45	47	38	57	68	77	63	42
57	37	89	90	71	58	55	53	63	69	75	57
53	69	84	80	68	72	51	47	68	68	70	47
54	76	81	99	51	70	64	88	63	88	69	42
64	54	97	95	86	57	46	57	81	77	64	52
53	60	110	70	55	75	40	48	56	69	42	33
48	67	89	102	55	44	50	60	77	84	44	?

Note: “?” denotes unreliable data; we attribute these measurement errors to omissions by the agency’s personnel in reporting or recording activities in the management information system.

## RESULTS

During 2000-2008, the focal EDA implemented an average of 58 programs per month. Peaks were reached in March 2007 (110 programs) and April 2008 (102). A trough occurred in September 2000 (22 programs). How well does our model predict these peaks and troughs?

Table 4 shows the results of model calibration. The amplitude of the sine wave, parameter  $a_3$ , is statistically significant at the conventional  $p \leq 0.05$  level. This supports our contention that the agency’s program implementations follow a wave-like pattern. In addition, while coefficient  $a_5$  implies a cycle length of about approximately 5 months, coefficient  $a_4$  suggests that the start of the sine wave [ $\sin(t) = 0$ ] to be June 2000 (see Appendix 1 for more on the sine function).

<b>Table 4: Model Parameters</b>					
Parameter	Estimate	SE	t	p	Adj. R <sup>2</sup>
$a_1$	55.0712	4.87394	11.2991	$2.866 \times 10^{-19}$	0.88
$a_2$	0.136225	0.819583	1.66213	0.0997837	
$a_3$	-4.50814	2.27982	-1.97741	0.049893	
$a_4$	-12.0511	0.6274	-19.208	$1.7587 \times 10^{-34}$	
$a_5$	0.732978	0.00943293	77.7042	$8.76746 \times 10^{-88}$	

Figure 2 shows that the fitted model does a reasonable job of explaining the time varying pattern of demand for the programs (adjusted  $R^2 = 0.88$ ); for simplicity, only the first 20 data

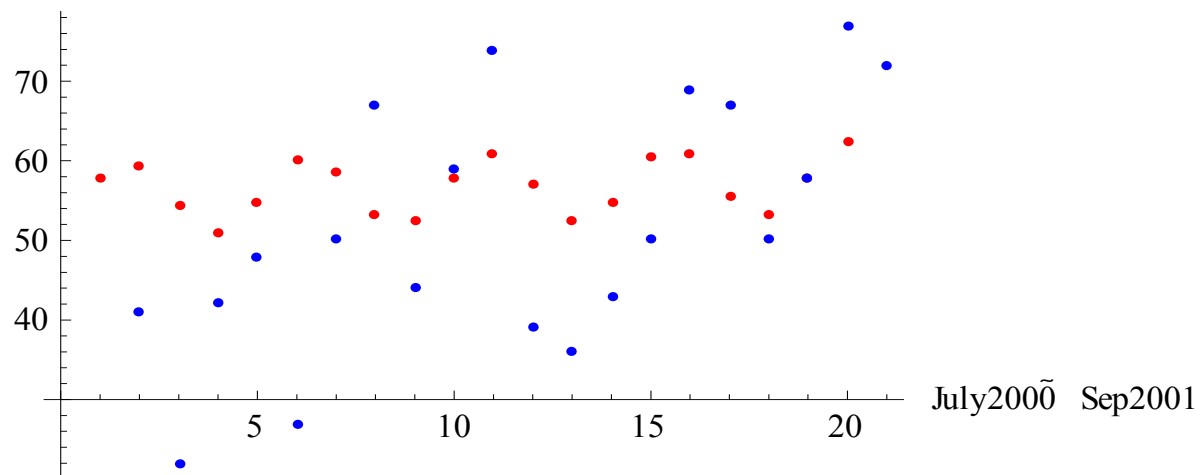
points are used to demonstrate model fit. Appendix 2 provides additional information about model predictions.

**Figure 2**

Model Fit: Actual versus Prediction –July 2000-Sep. 2001

$$\text{Model} = 55.0712 + 0.136225 * x[[q]] - 4.50814 * \text{Sfm}\left[\frac{-12.0811 + x[[q]]}{0.000000}\right] + 0.327167 * e[[q]]$$

□ of Programs



## DISCUSSION

The data-driven approach to marketing decision making suggests that the focal EDA should target the high potential customers shown in Table 5 to increase and/or defend market share; these are the counties that value the agency's programs more than other competitive alternatives. A longitudinal study of business performance reveals that firms find it difficult to maintain higher performance levels than their competitors for more than five years at a time (Kauffman, 1995). Long term competitive advantage is often obtained by adapting new sources of temporary advantage. We believe that such an advantage can be gained by gathering and utilizing proprietary insights about the markets given in Table 5 and Appendix 3. For instance, the economic-development aspirations of these customers – county-level decision making units, can be gathered and disseminated to program managers. This would enable program managers to sell “solutions”, that is, product bundles, to customers. For example, it could be beneficial to bundle community planning with other technical assistance such as economic-impact analysis and educational services. Note that most of the customers do not have the expertise in these areas and look elsewhere in the value chain for missing expertise.



**Table 5: High Potential Customers (2008)**

Peak of the Sine Wave (Time)	Top 3 Customers (Counties)	# of Programs
January 2008	McDonough, Sangamon, and Shelby	21
June 2008	Champaign, McLean, and Sangamon	18
November 2008	Peoria, Schuyler, and Stark	17
Note: A list of high potential customers for each of the years (2000-2008) is given in Appendix 3.		

Within a broader context, the drivers of community-economic development are changing. For example, government funding for community spending in Illinois is expected to fall from \$80 Mil in 2004 to \$70 Mil in 2014 (<http://www.illinoispolicy.org/news/article.asp?ArticleSource=2834>). The consequence of reduced funding would be enhanced competition among EDAs for provision of business services such as site-selection assistance, professional development (for example, seminars and management training), and business “greening” consulting (Currid-Halkett & Stolarick, 2011).

EDAs produce a variety of products and not all products need to generate profits; some of them may be produced for the good of society at large. However, in many cases EDAs do seek return on their investments. The market-selection method presented in this paper is an investment in future profitability.

## SUMMARY AND CONCLUSION

One of the essentials for competitive advantage is the ability to convert mere data into competitively useful insights about the marketplace. This paper spans counties, and EDA functions (for example, programs that help communities craft strategic plans), to translate programming data into marketing-planning insights.

Briefly, we suggest that the focal EDA’s programs target the Illinois counties listed below: Adams, McDonough, McLean, Peoria, Sangamon, and Warren. The targeting should be based on proprietary market research about customer’s incentive to implement the agency’s programs. For example, do these counties value the technical, or the complementary services of the agency?

In conclusion, in these turbulent times, slow and steady doesn’t win. Through analysis like this, EDAs can acquire market-insights to survive in this complex, post-financial-crisis world.

## REFERENCES

- Abucar, M. H. (1995). The Canadian Experience of Community Development: The Case of Guysborough County. *Community Development Journal*, 30(4), 337-346.

- Bahadir, S., S. Bharadwaj & M. Parzen (2005). A Meta-Analysis of the Determinants of Organic Sales Growth., Presented to the 2005 *INFORMS Marketing Science Conference*, Emory University.
- Cearbhaill, D. O. & S. O. Cinnéide (1995). Community Development in the West of Ireland. *Community Development Journal*, 21(3), 195-207.
- Cohendet, P. & E. Steinmueller (2000). The codification of knowledge: A conceptual and empirical exploration. *Industrial and Corporate Change*, 9(2), 195-203.
- Collins, P. D. (1972). Popular Participation and Local Government: Local Government and Community Development in Tanzania. *Community Development Journal*, 7(3), 176-182.
- Copulos, M. R. (1977). *Government Competition with Industry*. Washington, D. C.: The Heritage Foundation.
- Cossio, I. A & D. Winder (1985). Rural Community Development in Mexico: Issues and Trends. *Community Development Journal*, 20(2), 144-154.
- Currid-Halkett, E. & K. Stolarick (2011). The Great Divide: Economic Development Theory Versus Practice--A Survey of the Current Landscape. *Economic Development Quarterly*. Retrieved 16 February, 2011 from <http://edq.sagepub.com/content/25/2/143.short>.
- Dillon, W. R. & M. Goldstein (1984). *Multivariate Analysis: Methods and Applications*. New York: New York.
- East, R. E., W. Malcolm & M. Vanhuele (2008). *Consumer Behaviour: Applications in Marketing*. London, U.K. : Sage Publications Ltd.
- Gartner, D. & D. Halbherr (2004). *Are There Waves in Merger Activity After All?* Working Paper, University of Zurich, Socioeconomic Institute, Blümlisalpstr. 10, CH-8006 Zürich.
- Hackelman, D. C. & J. M. Duker (1980). Deal proneness and heavy usage: Merging two market segmentation criteria. *Journal of the Academy of Marketing Science*, 8(4), 332-344.
- Hafner, J. A. (1995). Beyond basic needs: Participation and village reforestation in Thailand. *Community Development Journal*, 30(1), 72-82.
- Hodge, P. (1966). Aspects of community development in the United Arab Republic. *Community Development Journal*, 1(3), 6-11.
- Jones, G. E. (1967). Rural development and agricultural extension: A sociological view. *Community Development Journal*, 2(6), 26-34.
- Kauffman, S. (1995). *At Home in the Universe*. New York: Oxford University Press.
- Kotler, P. & P. F. Drucker (1990). *Managing the Non-Profit Organization*. New York: Harper Collins.
- Lantz, A. (1995). *Heavy users of email : a questionnaire study*. IPLab report number 90, NADA, Royal Institute of Technology, Stockholm, Sweden.

- Lilien, G. R. & A. Rangaswamy (2004). *Marketing Engineering: Computer-Assisted Marketing Analysis and Planning (Revised Second Edition)*, Trafford Publishing.
- Litten, L. H. (1980). Marketing higher education: Benefits and risks for the American academic system. *The Journal of Higher Education*, 51(1), 40-59.
- Morgan, F. W. (1979). Are early triers heavy users? *Journal of Business*, 52(3), 429-434.
- Osborne, D. E. & T. Gaebler (1993). *Reinventing Government: How the Entrepreneurial Spirit is Transforming the Public Sector*. New York: Plume Books.
- Robinson, J. (1954). *The Economics of Imperfect Competition*. London: Macmillan & Co.
- Rossiter, J. R. & L. Percy (1996). *Advertising Communication and Promotion Management*. New York: McGraw-Hill.
- Varadarajan, R. (2009). *Strategic Marketing and Marketing Strategy: Domain, Definition, Fundamental Issues And Foundational Premises*, MSI Working Paper Series, 9-214.
- Wasink, P., & P. SeaBum (2000). Comparison methods for identifying heavy users. *Journal of Advertising Research*, 40(4), 61-72.
- White, R. E. & R. G. Hammermesh (1981). Toward a model of business unit performance: An integrative approach, *The Academy of Management Review*, 6(2), 213-223.
- Wilkie, W. & Moore, E. (2007). What does the definition of marketing tell us about ourselves? *Journal of Public Policy & Marketing*, 26 (2), 269-276.

# **APPENDIX 1** **THE HARMONIC OSCILLATIONS: COMPUTING THE WAVE LENGTH**

Express the sine component of equation 2 in the form:

$$\begin{aligned} a_3 \sin \left[ \frac{a_4 + t}{a_5} \right] &= -a_3 \cos \left[ \frac{t}{a_5} + \frac{a_4}{a_5} - \frac{\pi}{2} \right] \\ &= a_3 \cos \left[ \frac{t}{a_5} + \frac{a_4}{a_5} - \frac{\pi}{2} + 6\pi \right] \end{aligned} \quad (A1)$$

Simplifying using relevant parameters results in:

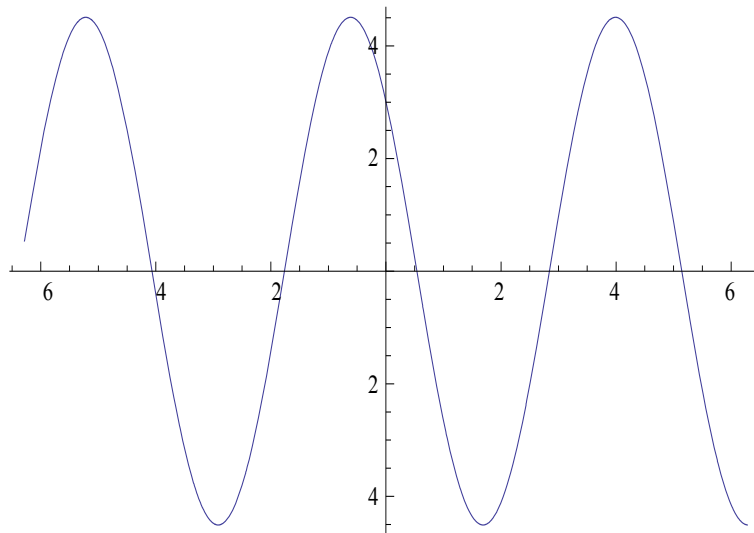
$$a_3 \sin \left[ \frac{a_4 + t}{a_5} \right] = 4.508 \cos \left[ \frac{t}{.73298} + .8372 \right] \quad (A2)$$

Now consider figure AF1. It is a plot of the function  $4.508 \cos \left[ \frac{t}{.73298} + .8372 \right]$  where,  $t$  ranges from  $-2\pi$  to  $2\pi$ .

Figure AF1

Plot of the Function

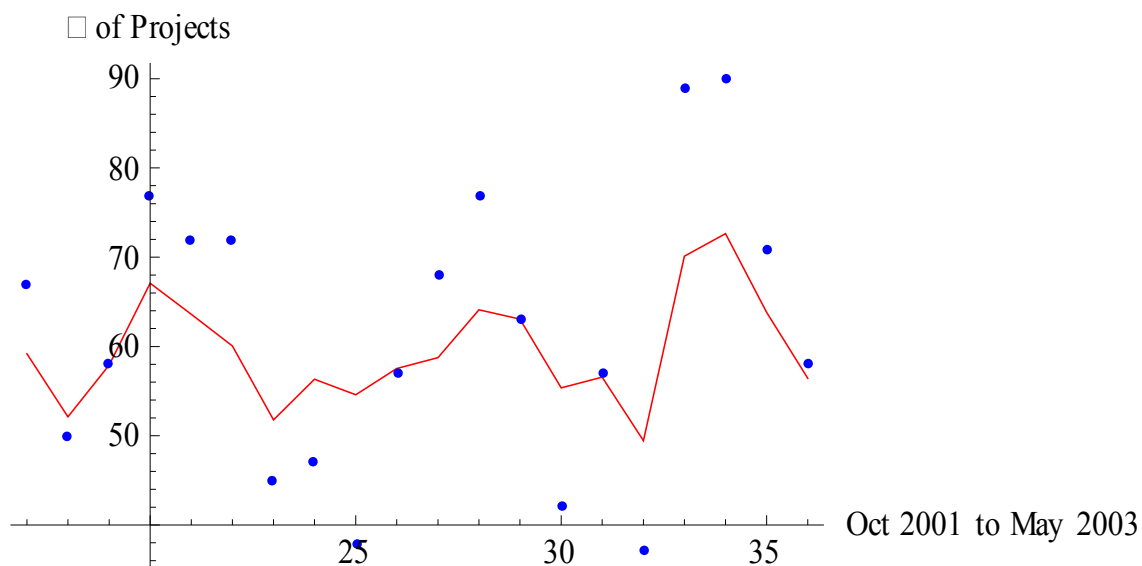
$$4.508 \cos \left[ \frac{t}{.73298} + .8372 \right]$$



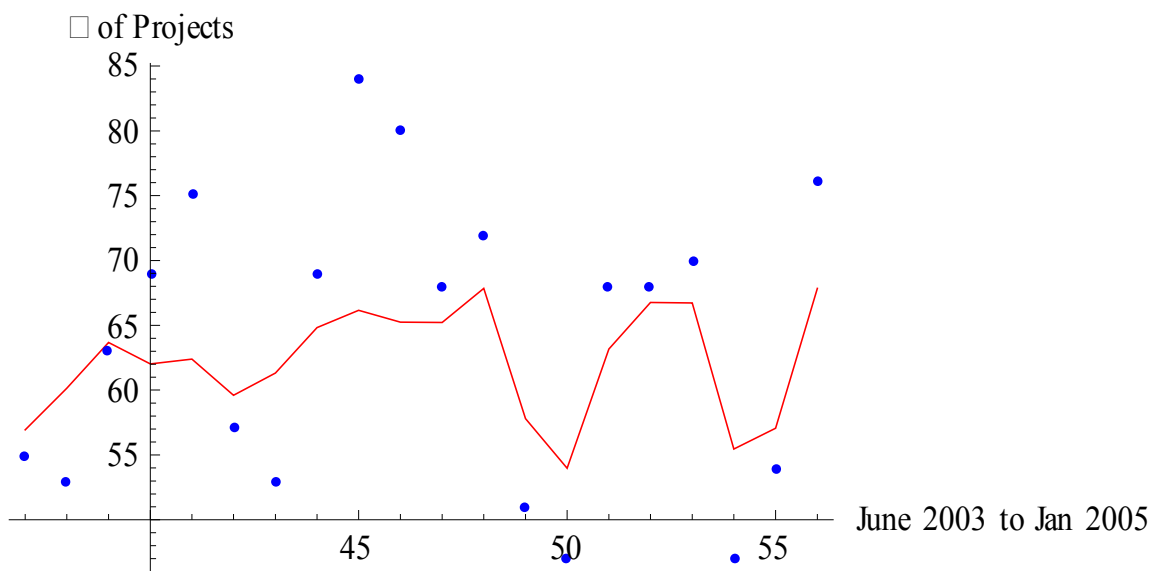
Note the wave length in Figure 1, around 5  $t$  units. This suggests that the agency's programming peaks once in five months beginning June 2000.

**APPENDIX 2  
MODEL FIT**

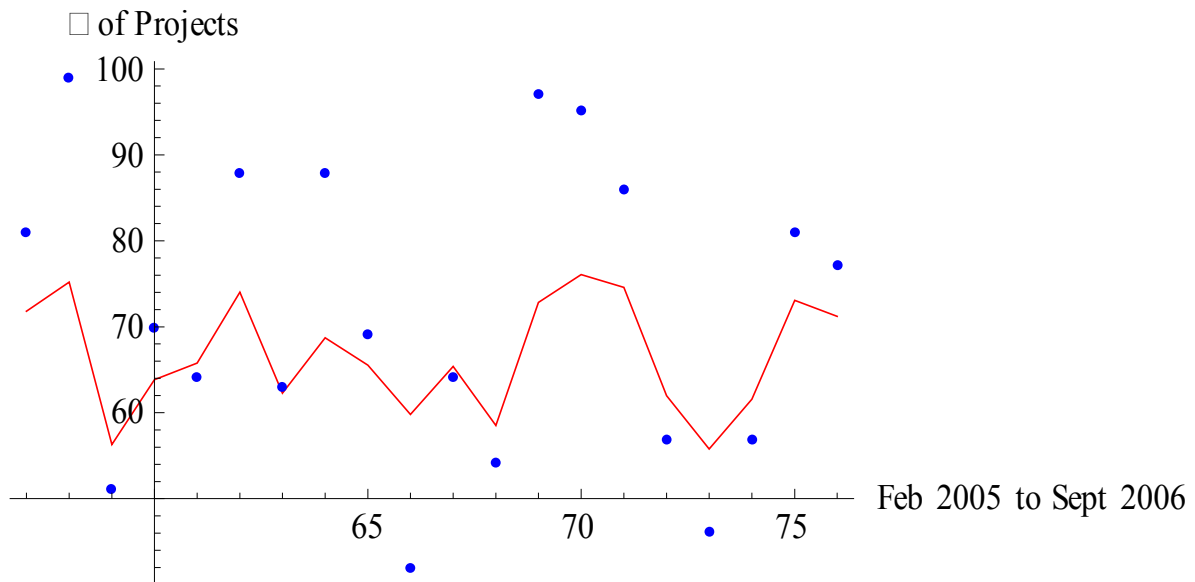
Data points: October 2001 – May 2003



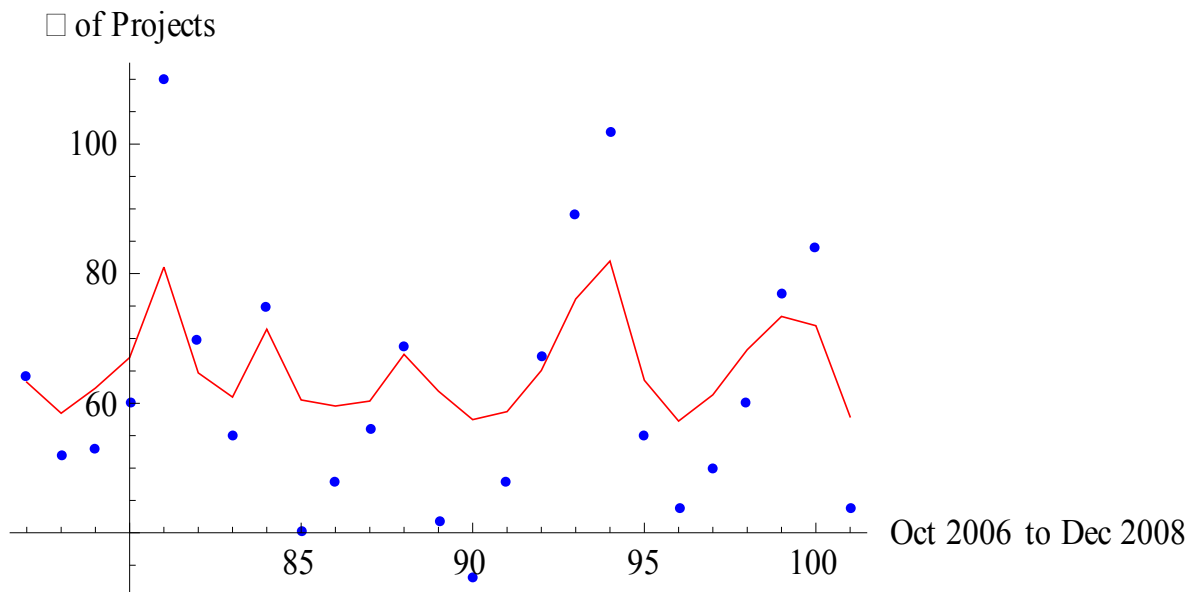
Data points: June 2003 – January 2005



Data points: February 2005 – September 2006



Data points: October 2006 – December 2008



### APPENDIX 3

#### ATTRACTIVE COUNTIES FOR THE FOCAL EDA

We posit that a community-economic-development market offering has two orthogonal characteristics: value of the offering, and the cost of the program for the customer (price). The term orthogonal implies that changes in price do not affect the value of the offering. Rather, it changes the customer's incentive or intention to purchase the market offering (incentive to purchase = value – price). Customers at the peak of the sine curve believe that:

$$[\text{Value}_{\text{EDA PROGRAM}} - \text{Price}_{\text{EDA PROGRAM}}] > [\text{Value}_{\text{COMPETITOR'S}} - \text{Price}_{\text{COMPETITOR'S}}]$$

Simply put, customers at the peak of the sine curve possess a greater incentive to purchase the agency's products.

<b>Table A3.1: Large Customers: IL Counties</b>	
Year	Counties
2008	McDonough, McLean, and Sangamon
2007	McDonough, McLean, Peoria, and Sangamon
2006	Fulton, McDonough, McLean, Peoria, and Sangamon
2005	Adams, McDonough, Sangamon, and Warren
2004	Adams, McDonough, and Sangamon
2003	Adams, Knox, Sangamon, and Warren
2002	Adams, LaSalle, McDonough, Sangamon, St. Clair, and Washington
2001	Adams, Hancock, Knox, McDonough, Rock Island, and Sangamon
2000	Fulton, McDonough, and Sangamon

