

Discriminant Analysis

Classification Model

Multivariate Solutions

Discriminant Analysis

- ***Discriminant analysis is used in situations where you want to build a predictive model of group membership based on observed characteristics of each case. The procedure generates a discriminant function based on linear combinations of the predictor variables that provide the best discrimination between the groups.***
- ***The functions are generated from a sample of cases for which group membership is known.***
- ***The functions can then be applied to new cases with measurements for the predictor variables but unknown group membership .***

Discriminant Function

- ***The data structure for Discriminant Analysis is a single grouping variable that is predicted by a series of other variables. The function is presented like this: $Y' = X_1W_1 + X_2W_2 + X_3W_3 + \dots X_nW_n + \text{Constant}$.***
- ***The dependent variable consists of discrete groups that we use to define our function. The function seeks to maximize the distance between those groups to come up with a function that has strong discriminatory power among the groups.***
- ***Discriminant Analysis can be used in both an exploratory and predictive mode. The function can determine whether there are differences among the average scores of a series of variables for two or more groups and determine which variables account for these differences.***
- ***The function can be used as a statistically-based classification procedure to predict future group membership.***

Discriminant Output

- ***The Discriminant Function Produces Both Standardized and Raw Coefficients.***
- ***Standardized Coefficients can be used as weights when exploring which attributes best contribute to the discrimination between the dependent groups. For Example, if 'Market Support' has a standardized coefficient of .5, and 'Solid Technical' support has a standardized coefficient of .25, it can be said that Market Support has twice the discriminating power of Solid Technical Support. Standardized coefficients near zero can be said to have little impact on the discriminating process. Negative standardized coefficients contribute toward alternative group membership.***
- ***The Discriminant Function produces a Discriminant Score and Probability of Group Membership for each respondent. These can be used in conjunction with raw discriminant coefficients for future reclassification of potential clients.***
- ***The Function produces a 'Correctly Classified' percentage and Wilk's Lambda Chi-Square Function which accounts for the percentage of variance explained (1-p) in the model.***

Reclassification Procedure

- ***First Step: Respondent answers to all queries that exists in the current model.***
- ***Second Step: Responses are loaded into calculation sheet. At the bottom of the sheet the discriminant score (which would be a raw score in our function) is calculated.***
- ***Third Step: The resulting discriminant score is compared to the enclosed Look-Up table, which consists of the array of discriminant scores and percentages of group membership generated by the known discriminant function. The corresponding (or close) percentage gives group membership probability. For example, a respondent answers question and receives a discriminant score of 4.795. Examining the look-up table, this value falls around 82% probability of group membership. It can then be said that this candidate has about a 82% chance of likelihood to be in our target group. In other words, he is a good candidate.***

Standardized Discriminant Coefficients

Variables Present in Model Equation	Standardized Canonical Discriminant Function Coefficients
Strong marketing support	0.937
Availability of educational services	0.400
Solid technical support	0.343
Highly quality customer service	0.335
Cooperative advertising	0.282
Strong joint venture support	0.245
Brand Awareness	0.238
Percentage of Employees Who Are Technical	0.172
Average sale (\$)	0.143
Size-Number of employees	-0.034
Annual revenues (\$)	-0.044

67.4% of original grouped cases correctly classified

Raw Discriminant Coefficients

Variables Present in Model Equation	Raw Canonical Discriminant Function Coefficients
Strong marketing support	1.927
Solid technical support	1.032
Size-Number of employees	-0.041
Percentage of Employees Who Are Technical	0.263
Strong joint venture support	0.597
Cooperative advertising	1.037
Brand Awareness	0.532
Average sale (\$)	0.165
Availability of educational services	0.900
Annual revenues (\$)	-0.054
Highly quality customer service	0.674

67.4% of original grouped cases correctly classified

Predicted Group Membership

COMPANY	Predicted Group	Probabilities of Membership in	
		Group	Discriminant Score
Markle John Mary R Foundation	Likely	93%	5.91
Crossroads Home Care & Hospice	Likely	92%	5.84
Creative Web	Likely	82%	4.80
Netad Inc	Likely	72%	4.78
Bennett Research Services	Likely	72%	4.78
Margert Community Corp	Likely	71%	4.76
New York Chiropractic Council	Likely	71%	4.69
Trilateral Commission	Likely	71%	4.69
Jonden Manufacturing Co Inc	Likely	71%	4.69
Robert Half International Inc	Likely	70%	4.64
Iq Productions Inc	Likely	70%	4.63
Fashion Apparel Industries	Likely	70%	4.63
Home Nrsing Assn of Wstchester	Not Likely	36%	2.30
Display Systems Inc	Not Likely	36%	2.30
Fund For Independent Pubg Inc	Not Likely	36%	2.30
Coldwell Bnkr Napolitano Rty	Not Likely	36%	2.29
Ficomm Designs Intl Inc	Not Likely	35%	2.22
Prospect Svnth-Day Advntst Chrc	Not Likely	35%	2.22
Premier Medical Healthcare	Not Likely	34%	2.18
A M Globe Not Inc	Not Likely	32%	2.00
Vocom International Telecom	Not Likely	32%	1.96
Richard Welch & Associates	Not Likely	31%	1.91
Psychological Motivations Inc	Not Likely	31%	1.90
Elmhurst Senior Center	Not Likely	31%	1.90
Cardinal McCloskey School & Ho	Not Likely	30%	1.85
Nova Instrument Corp	Not Likely	30%	1.85
Classique Perfumes Inc	Not Likely	30%	1.80
Artspan	Not Likely	29%	1.78
D C M Consulting Inc	Not Likely	29%	1.78
Rochdale Securities Corp	Not Likely	27%	1.63
MICROEDGE INC.	Not Likely	27%	1.63
Vahl Engineering Co	Not Likely	27%	1.58
Shutterflycom Inc	Not Likely	27%	1.58
Revival Home Health Care Inc	Not Likely	27%	1.56
Atlantic Northeast Inc	Not Likely	27%	1.55
Kobrand Corp	Not Likely	26%	1.50
Playmates Inc	Not Likely	26%	1.48
Spin Consulting Group	Not Likely	24%	1.35
Evolution On Line Systems Inc	Not Likely	22%	1.11
Commercial and Indus Capitl	Not Likely	21%	1.05
Cummins Metropower Inc	Not Likely	21%	1.05
Washington Hts & Inwood Dev	Not Likely	16%	1.00
Ben Greenfield	Not Likely	9%	0.82
I Spiewak & Sons Inc	Not Likely	6%	0.46

Discriminant Score Calculation

	Discriminant Coefficients	Attribute	Score Contribution
Strong marketing support	1.927	1	1.927
Solid technical support	1.032	1	1.032
Size-Number of employees	-0.041	1	-0.041
Percentage of Employees Who Are Technical	0.263	2	0.526
Strong joint venture support	0.597	1	0.597
Cooperative advertising	1.037	0	0.000
Brand Awareness	0.532	1	0.532
Average sale (\$)	0.165	2	0.330
Availability of educational services	0.900	0	0.000
Annual revenues (\$)	-0.054	2	-0.108
Highly quality customer service	0.674	0	0.000
	Discriminant Score		4.795

Key For Continuous Variables

Percentage of Employees Who Are Technical

1=Under 20%

2=20-40%

3=More than 40%

Size-Number of employees of clients

1=25 Or Under

2=26 thru 100

3=More than 100

Average sale (\$)

1=Through \$5000

2=\$5001 thru \$25000

3=More than \$25,000

Annual revenues (\$)

1=\$800,000 or Under

2=\$800,001 to \$5,000,000

3=\$5,000,000 or More