MODERN RETAIL, INC.

REQUEST FOR PROPOSAL
RFP #: TF – F1.H2

TITLE: ARIZONA SALES MODELING
CLOSING DATE AND TIME: SEPTEMBER 28. 2016 @ 5:00 PM

Arizona Sales Modeling: TF – F1.H2

Background and Purpose

By responding to this Request for Proposal (RFP), the Proposer agrees that s/he has read and understood all documents within this RFP package.

Submission Details

Responders to this RFP should supply:

- A business report up to 3 pages (not including cover page or table of contents), including any supporting plots and tables.
- The commented code used to produce the results.

The report should address **all points described in the "Objective" section** below.

The report should be returned in the following way:

- Electronic (mailto: Aric_LaBarr@ncsu.edu; Subject Line: Arizona Sales Modeling)

Objective

Modern Retail Incorporated (hereafter the "Store"), acting by and through its department of *Marketing and Sales Analysis* is seeking proposals for retail analytics services. Successful completion of this proposal will lead to a secondary counter proposal for further modeling. The proposal includes data from two stores – Phoenix and Tuscan, AZ. The scope of services includes the following:

- Creation of an weekly forecast for sales in both Phoenix, AZ and Tuscan, AZ from an Exponential Smoothing Model (ESM); The Store's analysts know that the data is *not* seasonal and would like ESM's for each store built separately (no aggregation of sale across stores).
- Evaluation of the data from each store to handle further time series modeling:
    - Check the stationarity of the sales from each store; the analysts recommend using the Augmented Dickey-Fuller tests up to lag 2 for the results, however, you are welcome to suggest other techniques as long as the reasons are clearly stated and supported.
    - What strategies (if any) should the marketing analysis team take to make the data stationary?
- The Store uses Mean Absolute Percentage Error (MAPE) in calculating the accuracy of its forecasts; Report this measure for the validation data set; The Store is open to other measurements in addition to the MAPE as long as they are clearly stated and supported.
- The Store's analysts recommend testing the residuals from the final ESM's to check if they are white noise; The p-value(s) should be listed as well as results interpreted.

Data Provided

The following data set is provided for the proposal:

- The data set **AZ_SALES** contains weekly sales of two cities (Phoenix and Tuscan) from September 18, 2011 to September 4, 2016.
    - The data is collected from our sales team and should be relatively clean. However, a validation data set has not been created for you. The Store recommends setting aside 16 weeks for a validation data set before you model or run any analysis.