# Leveraging AI to Predict Customer Acquisition in Professional Services

**American Marketing Association, Winter Conference**
**Phoenix, February 16, 2025**


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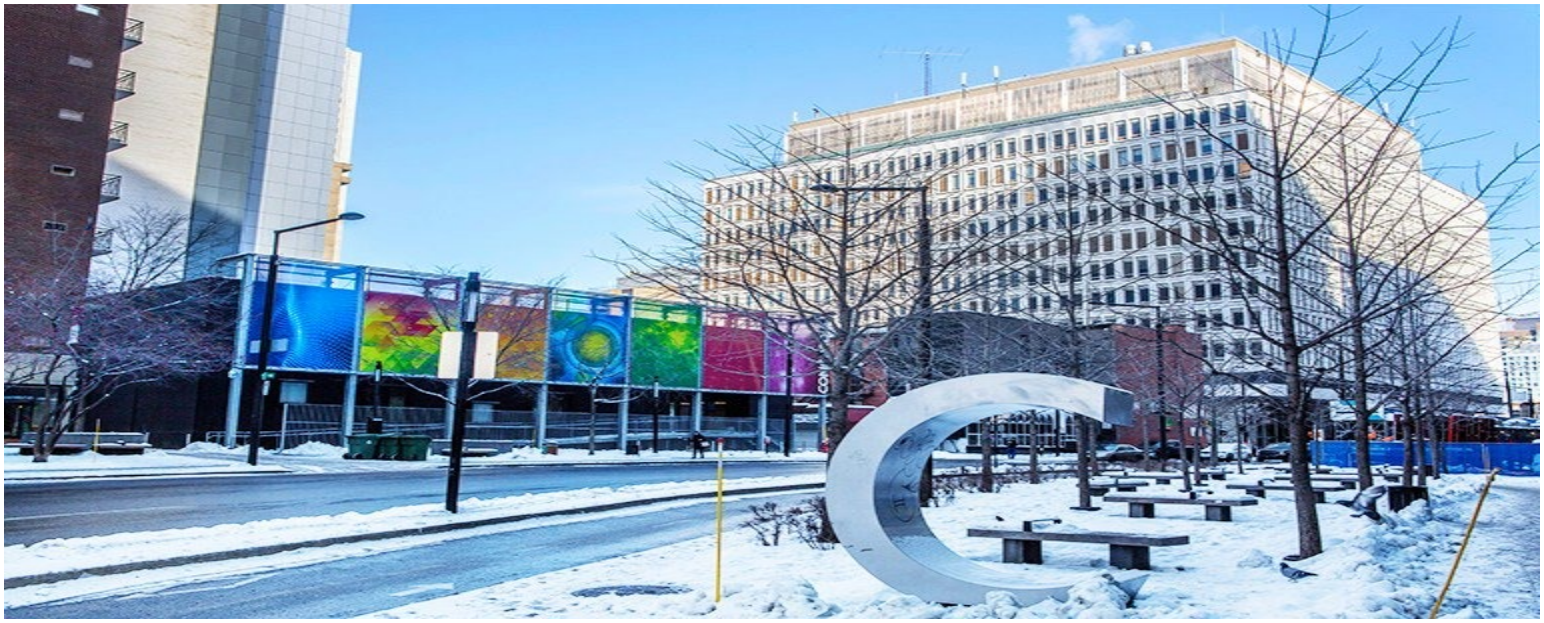

# Professional Services Marketplace

- The market for professional services in the U.S is estimated to be worth over half a billion dollar
  - This includes electricians, plumbers, and home improvement

- Customer acquisition in the professional services marketplace has high asymmetry which increases the cost of acquisition

# Customer Acquisition

- Potential customers reach out to the firm to request an estimate on the work that they are in need of
- The firm responds by providing a proposal for the work, the customer can choose to accept or decline the estimate
- It is estimated that potential customer solicit an average of three proposals before they accept one (Majid, 2021)

# Customer Acquisition

- If firms were able to screen customers and identify those most likely to accept their proposal and closest to making a purchase decision then they can focus their resources on closing the sale (Thomas, 2001)

- An inability to screen customers properly increases the acquisition cost on consumers (Thomas, 2001)

# Customer placement in the funnel

# Customer Details

- Based on theories of temporal construal, as consumers move closer to the time of purchase they are more likely to focus on specific details (Trope & Liberman, 2003)

- Customers provide details to the firm about the work they are looking for

# AI as a natural language processor

- AI can be used to interpret the information given by customers and ascertain their placement in the sales funnel and how close they are to purchase

- General: “kitchen remodel,” versus specific “We are looking to improve our kitchen functionality and storage. Our 100-year-old house has had many hands on it over the years, including some subpar DIY work. We would like design advice and contract work to make the vital part of our house do more for us.””

# Information customers provide

First Name *

Last Name *

Email *

Phone Number *

Street Address

City

State

Zip

Tell us about your project: *

# Sample

- The sample came from prospective customers of a home improvement firm that services a large metropolitan area in the mid-Atlantic region
- The firm has averaged over $4 million in annual revenue from 2021 to 2024
- The sample contained 220 prospective customers that reached out to the firm via its website, we trained the model on a sample of 40

# Training AI

- To analyze the comments given by consumers we followed the procedures outlined by Rai (2020).

- We first preprocessed the data to remove noise, such as names or bullet points, that might separate requests. We then used the AI language model, ChatGPT 4.0, to analyze the comments. ChatGPT 4.0 was selected because it is well-suited to identifying patterns in unstructured text.

- Our goal was to measure the level of specificity and personalization in the comments provided by potential customers. We hypothesized that customers who provide more specific information are further down the sales funnel and more likely to make a purchase decision soon. Additionally, we proposed that a potential customer who crafted a personalized message to the firm was more likely to choose that firm over its competitors.

# Training AI

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| Specificity 1 - 4 | |
|---|---|
| “Small master bath needs remodeling. Only has small shower stall, no tub, toilet, and vanity. Shower needs new pan and drain, retiled, security bars, and showerhead/knobs. Tiles removed from walls (they are halfway up the wall now). New toilet. Vanity is new, never used, would like to keep and get hooked up. New exhaust fan, medicine cabinet. Floor will probably need retiling once wall tiles removed, as there will most likely be a gap. Not sure the outside wall is insulated well, so insulation may need to be applied. It was always cold in shower. Need done ASAP. Hubby has developed mobility issues and needs to use bathroom for more than just a toilet…only thing working in it at moment.” – Given a score of 4 | “We need an estimate for repairs to our house.” – Given a score of 1 |

# Training AI

- Are you just counting words? (AI scored this a 3 on specificity, they didn't purchase)

- We got your company's name from my brother, who I understand worked with you to re-do the flooring in his basement a few years ago. I am reaching out because we recently had a sump pump failure that flooded a portion of our basement, and we would like to replace our flooring and some damaged/removed floorboards. Currently we have laminate, but we are open to other options (LVT, etc.). The flooring that would need to be removed and replaced would likely span a large rec room, a bedroom, and a storage closet that the rec room flows into. Some additional work is needed to replace at least the plastic liner under the rubber tiles in our basement gym that was damaged by water, but we are also considering replacing the rubber tiles with the same flooring that is installed in the other rooms.

  If this is something your company would handle, we are hoping to get an estimate soon as we would like to proceed with the project in the near term. My contact info is above if you have questions or would like to schedule a time to come out to take a look. Phone or email is fine to reach me. Thank you in advance.

# Variables



| Abbreviation | Variable Explanation | Source |
|---|---|---|
| WoM | If the primary sales channel was word-of-mouth. This is a binary variable, 1 or 0. | Consumer input on form |
| Web | If the primary sales channel was an Internet search. This is a binary variable, 1 or 0. | Consumer input on form |
| Previous | If the customer was a previous customer. This is a binary variable, 1 or 0. | Consumer input on form |
| Personalized | This is a binary variable, 1 or 0. If the comments provided to the firm were deemed to contain information that was specific to the firm. For example, the following customer was determined to have submitted a personalized message, "You did some work for the owners here a few years ago, and they recommended you to me. I am their tenant, and we are preparing to move out on July 5th. We need to do some repair work on the house before the move-out inspection by the owners - mostly drywall work and painting. Can we set up an appointment for you to come to the house and give us an estimate? Thanks." | AI trained machine learning algorithm |
| Specificity | Given a scale of 1 – 4. A four indicated high specificity while a 1 indicated low specificity. ChatGPT was trained on a sample of 40 prospective customers. | AI trained machine learning algorithm |
| ScaleHouseValue | The value of the house as estimated by Zillow.com. The house values were taken between June and September 2024. | Zillow.com |
| LogContract | The contract is the proposed amount for the requested services. We took the natural logarithm of the amount so that the range of values could be condensed for interpretation purposes. The lowest proposed contract amount was $445.00 while the highest proposed contract amount was $161,100. The average proposed amount was $32,627. | Home improvement firm, in most cases a single estimator employed by the firm |

# Empirical Analysis

- Accelerated hazard model

- $$H(t) = 1 - (e^{B_0(-1)(t)+B_1(WoM)+B_2(Web)+B_3(Previous)+B_4(Specificity)+B_5(Personalized)+B_6(ScaleHouseValue)+B_6(LogContract)+e_i})$$

# Results

| Parameter | Estimate | Std Error | Z-Score | Pr(Z) | Increase in Probability above baseline at Time (1) | Expected time to accept proposal based on covariate (in days) |
|---|---|---|---|---|---|---|
| Intercept | .784 | 1.807 | .434 | .664 | | |
| WoM | 1.057 | .395 | 2.676 | .007 | -65.2% | 15.86 |
| Web | .518 | .484 | 1.069 | .285 | -67.9% | 27.31 |
| Previous | 1.466 | .462 | 3.171 | .002 | -76.9% | 10.54 |
| Specificity | -.454 | .270 | -1.683 | .009 | 57.4% | 1.39 |
| Personalized | .418 | .282 | 1.484 | .137 | -34.2% | 30.00 |
| ScaleHouseValue | .008 | .024 | .323 | .746 | -.812% | 45.29 |
| LogContract | .806 | .371 | 2.173 | .029 | -55.3% | 20.39 |
| | | | | | | |
| Log(Scale) = -.348, p < 0.05 | | | | | | |
| | | | | | | |

# Contribution

- This study provides insights into how a language model based on generative pre-trained transformer (GPT) architecture, such as ChatGPT, can be used to analyze consumer comments to assess their position in the sales funnel.

# Questions/ Comments?

Full presentation available at www.kashefmajid.com

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