DISSERTATION PROPOSAL

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"Unveiling Market Forces: AI-Powered Insights into Celebrity Potential, Visual Uniqueness, and Sustainable Badges in E-Commerce"

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Chapter I

Beyond a Pretty Face: An AI Method to Score Celebrity Visual Potential

It has long been a mantra of marketing practice that, particularly in low involvement situations, spokespeople should be attractive. But is there more to one's probability of gaining fame and influence (i.e., celebrity potential), than is captured by attractiveness or typicality? This paper suggests the answer is yes. The paper begins by identifying 11 facial features that, by virtue of their purported relationship with charisma and resulting personality trait inferences, may predict celebrity potential. Using machine learning methods and a sample of 22,000 faces, the authors then calculate the direction and strength of each proposed facial feature's correlation with celebrity potential. The model demonstrates 95.92% accuracy in predicting whether a given face belongs to a celebrity or non-celebrity, and allows the authors to calculate a *celebrity visual potential* (CVP) metric for any face. Two controlled experiments and two studies using faces from Instagram and LinkedIn, further validate that the model-generated CVP is consistent with human-rated CVP, showing predictive power above and beyond facial typicality and averageness. Together, the findings challenge prior assumptions about the importance of attractiveness in spokesperson choice, offer a useful additional metric for marketers, and provide novel insights about the relative importance of various inferred personality traits.

Keywords: Celebrity Visual Potential, Facial Features, Personality Traits, Deep Learning, XAI.

Chapter II

Visual Uniqueness Advantage

Airbnb often highlights uniqueness as its key advantage over hotels. However, no study has quantified visual uniqueness with scalability on peer-to-peer (P2P) platforms in marketing or machine learning literature. Based on a dataset with all of the over 14,000 properties in New York City across 13 months, we filled the gap following 3 steps. First, we built a machine learning model on over 480,000 property images to compute the visual uniqueness of Airbnb properties with contrastive loss and random data augmentation, and the model achieves 88.10% accuracy on a hold-out set. Second, we identified important image features that make the room unique via uniqueness heatmaps generated from advanced explainable AI techniques, and found that decorations (e.g., pillows, paintings) may help enhance room uniqueness. Third, we validated model accuracy against human judgment via two survey and an eye-tracking experiment, and found that both the visual uniqueness score and heatmap predicted from our model are consistent with human judgment. We also discussed discriminative validity on aesthetics and visual complexity validated with data. Finally, we conducted demand analysis and found an inverse U-shape relationship between uniqueness and demand. We also found positive moderation effects of host reputation and property quality. No first impression impact from cover image uniqueness is found. This research fills the methodological and conceptual gaps in defining and capturing visual uniqueness and offers important managerial

implications for sharing economy platforms like Airbnb and their individual suppliers (e.g., hosts) to leverage the uniqueness premium in optimizing the visual presentation.

Chapter III

The Impact of Amazon Climate Pledge Friendly Badge on Sales and Seller Competition

Sustainability and green marketing are gaining significant momentum. In recent years, there's been a surge in consumer interest in eco-friendly products. To cater to this growing eco-conscious consumer base, Amazon, as a major e-commerce platform, introduced the Climate Pledge Friendly (CPF) badge in 2020 to showcase its commitment to sustainability and encourage the sale of environmentally conscious products. However, there's a lack of comprehensive research on how these green labels influence sales and competition among sellers on e-commerce platforms. Using a rich daily dataset on over 6,000 products across six months sold on Amazon, the proposed research aims to explore three key questions. First, the causal impact of CPF badge on sales. Using the interactive fixed effect counterfactual estimator, based on product features extracted from unstructured data on images, descriptions and customer reviews using advanced machine learning models in computer vision and natural language processing, we investigate how adopting the CPF badge affects product sales and what factors drive this impact. It's unclear how green badges influence sales, as the badge might attract eco-conscious consumers and enhance brand trust, but it may also suggest higher prices, reduced quality, or inferior aesthetics, potentially impacting sales. Second, the effect of CPF badge on seller competition. We are the first to examine the badge's impact on seller competition on Amazon. Using a structural econometrics model, we explore how sellers' decisions regarding product offerings and green certifications, as well as Amazon's choice to apply the badge, influence sales, brand perception, and customer reviews. Third, we aim to suggest strategies to improve the sales and brand image of green products based on the structural model. This research endeavors to deepen the understanding of the influence of green badges on sales and seller competition and provide actionable insights for sellers to enhance their sustainable product offerings and brand perception.