A Network-Based Approach to Modeling Product Co-consideration and Choice Relations

Yinshuang Xiao, Yaxin Cui, Wei Chen, Johan Koskinen, Noshir Contractor, Zhenghui Sha

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Customers often compare several products from different manufacturers before making the final purchase decision. A better understanding of the key factors that influence customers to choose one product over another is critical for stakeholders to maintain market competitiveness and share, and to support product design decision-making. This study employs network approaches such as Exponential Random Graph Model (ERGM) to study customer preferences in consideration and choice by modeling product co-consideration and choice relations in two unidimensional networks. The first co-consideration network is weighted and undirected, with each node representing a product and a link weight representing the frequency with which any two nodes are co-considered by customers. The second choice network is unweighted and directed, where the directed link indicates that the end node is more likely to be purchased than the start node. Using a set of vacuum cleaner customer survey data, we first construct the co-consideration network and use the estimated parameters from the ERGM model to identify the key design features that are valued by customers when making the comparison. Then, we build the choice network and based on ERGM analysis, we study why some vacuum cleaners are more likely to be purchased than others (e.g., more powerful suction power or larger dust capacity, etc.). These analyses help designers and other stakeholders better understand customer preferences, which are important to the design and development of more competitive products.