Proceedings of the 2nd World Congress on Industrial Engineering and Operations Management
Windsor, Canada, October 14-16, 2025

Proceedings of the International Conference on Industrial Engineering and Operations Management

Publisher: IEOM Society International, USA DOI: 10.46254/WC02.20250223
Published: October 14, 2025

Freemium Pricing and CRM Expenditures by a Digital Platform

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Abstract

The freemium model is widely used by digital platforms to grow their user base and generate revenue. However, these platforms face complex trade-offs between acquisition, monetization, and retention—interactions that are rarely captured within a unified framework. We address this gap by developing a steady-state profit-maximization model in which users transition among non-user, free-user, and premium-user states through a Markov process. We determine how platforms should jointly optimize acquisition spending, retention investment, ad intensity, and subscription pricing to maximize the long-run profit. The model endogenizes transition probabilities and is solved numerically to evaluate optimal strategies under varying behavioral and market conditions. Results show that platforms often prioritize acquisition over retention, even when acquisition and retention carry equal costs, due to persistent churn in the premium tier. As premium quality improves, platforms initially invest more across all levers but later reduce retention spending and raise prices as user loyalty strengthens. Likewise, more effective retention tools raise profitability by increasing pricing power rather than expanding the premium user base. These findings reveal that stronger tools and features reshape platform strategy not through user growth, but through more efficient monetization.

Keywords
Freemium Pricing, Digital Platforms, Customer Relationship Marketing and Markov Chain.

Acknowledgements
Research supported by NSERC Canada, grant RGPIN-2021-02462.

Biographies

Melina Asadi is a PhD candidate in Decision Sciences at HEC Montréal and a member of GERAD. Her doctoral research, supervised by Professor Georges Zaccour, focuses on pricing and marketing strategies in digital service platforms, with particular emphasis on freemium models and customer relationship management. She holds an M.Sc. in Industrial Engineering from the University of Tehran and a B.Sc. in Industrial Engineering from Alzahra University. Her work has been presented at conferences such as CORS, and Optimization Days. Her research interests include optimization, game theory, machine learning, and revenue management.

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Georges Zaccour is a Full Professor of Management Science at HEC Mo ntréal and holds the Chair in Game Theory and Management. He is also a member of GERAD. He earned his PhD in Management Science from HEC Montréal. His research focuses on dynamic games, marketing channels, and applications of game theory in economics and management. He has published extensively in international journals and co-authored several books in these areas.