The Role of Internal Attributes and Social Networks in Predicting Music Popularity

A Thesis Submitted in Partial Fulfilment of the Requirements for the Fellow Programme in Management Indian Institute of Management Indore

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Abstract

Music has always been an integral part of human life. Friedrich Nietzsche, the great philosopher rightly said, "Without music, life would be a mistake". Music is formed by musical notes or sounds which have ripple patterns that repeat themselves. Music can be defined as sound which is made of a ripple pattern that repeats itself (Powell, p. 23). It doesn't really matter what is the source of the sound, it might not always come from a musical instrument, but if the sound has periodicity in its wave pattern, it is termed as music (Powell, p. 23, 24). In our thesis, we will be handling only those musical pieces that have been released online for commercial purposes (e.g., Zangerle et al., 2019).

Music has an immense impact on the physiology of the human body. Listening to music improves blood flow and reduces the stress-related hormones like cortisol and also reduces pain, ultimately creating a soothing feeling inside the listener[1]. However, Joanne Loewy, an associate professor and director of the Louis Armstrong Center for Music & Medicine at Mount Sinai Beth Israel in New York, says that listening to wrong music can often stimulate the negative emotions in our body and hence, instead of being relieved, we can tend to be more angry, violent, sad, or depressed and thus, "Silence can be better than random listening". This dichotomy forms the basic motivation behind the thesis, like some recent studies (e.g., Kowald et al., 2020) and that is, what kind of music actually makes people feel good.

Before a product is launched, if we can predict the popularity of the product after its launching, it becomes easier to predict the financial performance of the product. Similarly, in case of music industry, if we can predict how popular a song or a track would be before its release, it would

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[1] https://time.com/5254381/listening-to-music-health-benefits/

tell us about the commercial success of the song or track (Pachet, 2012). According to the recent International Federation of the Phonographic Industry (IFPI) data in 2021 the global revenue of music has grown by 7.4%, of which streaming revenue has grown by 18.5% whereas physical revenues has gone down by 4.7% and the downloads have gone down by 15.7%[2]. This indicates clearly that success rate of music is erratic as the revenues are not growing in all forms of commercial music and music producers are finding it difficult to predict the music sales (Aguiar and Waldfogel, 2018). On the other hand, the availability of online musical data has increased considerably over the last decade (Casey et al., 2008). These two aspects predominantly, form the motivation behind the study.

The primary objective of our thesis is to add to the literature of finding the factors that impact music popularity. For the thesis purpose, factors that have an impact on music popularity have been divided into two sub-factors: internal and external. If we observe the existing literature, we can find that the different predictors impacting music popularity can be clubbed together into these two factors. Internal factors are those which are present in the music itself. In other words, internal factors are those which form the composition of a musical track. Furthermore, the internal factors can be split into low-level and high-level internal factors. Low-level internal factors are the primary or fundamental internal music features that build the foundation of track, for example, pitch, tempo, and timbre. High-level internal factors are the secondary internal music features which are subject to the primary features, for example, danceability, energy, or valence. On the other hand, external factors are the social factors which are independent of the composition of the musical track and yet, may have an impact on popularity. For example, e-word-of-mouth (eWOM) about the song, or eWOM about the artist in social media, or the time of release of the song can be considered as the external factors. This dissertation aims to find

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[2] https://www.ifpi.org/wp-content/uploads/2020/03/GMR2021_STATE_OF_THE_INDUSTRY.pdf

the probable antecedents or drivers to music popularity with both the internal and external aspects. The internal aspects involve the low-level and high-level internal attributes of music whereas the external aspects are the social networking factors in the community of the listeners.

Our first essay is dealing with the impact of the low-level internal attributes on the popularity of music, which in this study, is represented by the number of listeners (Ren and Kauffman, 2017). In this work, we examine the effects of internal music features like variation of pitch, number of beats and variation of timbre on the popularity of music. Using digital music data from the Free Music Archive we build a model to identify the importance of these characteristics in determining the popularity of music. Our results show that variation of pitch and brightness of timbre have significant contributions to the popularity of music.

The second essay of our thesis concentrates on the impact of high-level internal music features on the popularity of music that can be extracted using an AI tool known as EchoNest. As we have already discussed, high-level features are dependent on the low-level features of music (Zangerle et al., 2019). Therefore, this can be argued with similar logic of the first chapter that the high-level internal music features also have an impact on music popularity like the low-level internal music features. In the second essay, we also try to see the interaction effect of an external factor (artist familiarity) on the impact of high-level internal factors. Using digital music data from the same Free Music Archive as the first essay we build a model to identify the importance of these characteristics in determining the popularity of music. Our results show that danceability, energy and valence have significant contribution to the popularity of music. Artist familiarity also plays a significant moderating role on these contributions.

The third essay of our thesis, is concerned about the social network effect, which is totally an external factor, on an individual's decision to listen to a musical piece, which in turn, enhances the popularity of that piece (Dewan et al., 2017). Individuals engage themselves in social

communities and their consuming behaviour depends largely on the way these communities behave (e.g., Katz and Lazarsfeld, 1955). The impact of social network influence on consumer behaviour has been studied for various products (e.g., Bapna and Umyarov, 2015). The role of social media influence for music has been studied on the basis of popularity and proximity (Dewan et al., 2017). This essay concentrates on the role of social network influence for music on the basis of perceived credibility which is split into three dimensions: perceived expertise, perceived homophily, and perceived friendship. We conduct a survey on a community that is interested in music in a social networking site to know the respective perceived credible sources and then conduct our experiment on the group by allowing them to listen to different tracks over one month and then after recording their behaviour, test our hypotheses. Our results show that perceived credibility of the recommenders have an impact on music popularity and also give us a further scope of research on how does diffusion take place in such a social network.

The dissertation to the best of our knowledge is one of the primitive works in the domain of music popularity as the literature has been found to be scanty. It has also added to the EchoNest literature in the form of the second and third essays. This work is also an addition to the social network literature and one of the few works that have been done with a social community relating to music. Practically, this work would be helpful for the music producers and composers who might be interested to know what might predict music popularity. Since music is used in movies as well in the form of playback and background music, we derive that the movie producers might be interested in this work as well.

6. Conclusion

6.1 Limitations and Future Scope

Our thesis has got some limitations as well. Firstly, we have not considered lyrics as an antecedent in this study as that is a song attribute, not a music attribute but in case of songs, literature suggests that lyrics play a major role in song popularity. Secondly, we have not considered tracks that experience tempoic changes in its journey. In other words, all the tracks in our data have fixed tempo. Thirdly, we could not solve the mystery behind rate of listening and recommending tracks. The diffusion of a track and the rate of diffusion seems to be a complex topic and cannot be explained in the simplistic way that we have adopted for the third study. Hence, we aim to explore this process in our future work and study node by node to get a clearer picture. We have already collected a data that is quite rich in information and thus, hopefully, it will help us to explore more interesting facets of music popularity, a topic that is very little explored.

6.2 Conclusion

Finally, we can conclude that music is a complex art form and how and why people like a musical piece is are some interesting questions to answer. In this study, we have found some antecedents that drive music popularity. We have empirically shown that music popularity is a subject of both internal and external factors. It is driven by low-level internal attributes such as pitch and timbre and high-level internal factors like danceability, energy, and valence. External factor like artist familiarity plays a moderating role in the impact of the high-level internal attributes on music popularity. In a community, source credibility is the external factor that drives music popularity both at the individualistic and community levels along with the effect

of high-level internal factors that play a role mostly in the individualistic level. We aim for a future research on the process of diffusion and rate of diffusion of music in a community.

7. References

Ajzen, I. (2011). The theory of planned behaviour: reactions and reflections. *Psychology and Health*, 26(9), 1113-1127.

Aguiar, L., & Waldfogel, J. (2018). As streaming reaches flood stage, does it stimulate or depress music sales? *International Journal of Industrial Organization*, 57(2018), 278-307.

Aral S., & Walker, D. (2011). Creating social contagion through viral product design: A randomized trial of peer influence in networks. *Management Science* 57(9), 1623–1639.

Arndt J. (1967). Role of product-related conversations in the diffusion of a new product. *Journal of Marketing Research* 4(3), 291–295.

Bagheri, A., Saraee, M., & De Jong, F. (2013). Care more about customers: Unsupervised domain-independent aspect detection for sentiment analysis of customer reviews. *Knowledge-Based Systems*, *52*, 201–213.

Bandura A. (1971). *Social Learning Theory* (Prentice Hall, Englewood Cliffs, NJ).

Banerjee, A., Chandrasekhar A.G., Duflo, E., & Jackson, M.O. (2013). The diffusion of microfinance. *Science* 341(2013), 363-371.

Bapna R., & Umyarov A. (2015). Do your online friends make you pay? A randomized field experiment in an online music social network. *Management Science* 61(8), 1902–1920.

Basili, R., Serafini, A., & Stellato, A. (2004). Classification of musical genre: a machine learning approach. In *Proceedings of the 5th international symposium on music information retrieval, Barcelona, Spain*.

Bhattacharjee, S., Gopal, R.D., Lertwachara, K., Marsden, J.R., and Telang, R. (2007). The effect of digital sharing technologies on music markets: A survival analysis of albums on ranking charts. *Management Science 53(9),* 1359-1374.

Blanton, H. (2013). Evaluating the self in the context of another: the three-selves model of social comparison assimilation and contrast. *Cognitive Social Psychology*. 79-91.

Bollen, J., Mao, H., & Zeng, X. (2011). Twitter Mood Predicts the Stock Market. *Journal of Computational Science*, 2(1), 1-8.

Bristor, J.M. (1990). Enhanced explanations of word of mouth communications: the power of relations. Research in Consumer Behaviour, 4 (1990), 51-83.

Brown J, Broderick A.J., & Lee N. (2007). Word of mouth communication within online communities: Conceptualizing the online social network. *Journal of Interactive Marketing* 21(3), 2-20.

Cai H., Chen Y., & Fang H. 2009. Observational learning: Evidence from a randomized natural field experiment. *American Economic Review*, 99(3), 864–882.

Casalo, L.V., Flavian, C., & Guinaliu, M. (2008). Fundaments of trust management in the development of virtual communities. *Management Research News*, 31(5), 324-338.

Casey, M. A., Veltkamp, R., Goto, M., Leman, M., Rhodes, C., & Slaney, M. (2008). Content-based information retrieval: Current directions and future challenges. *Proceedings of the IEEE, 96* (4), 668–696.

Chai, W., & Vercoe, B. (2001). Folk music classification using hidden Markov models. In *Proceedings of the 2001 international conference on artificial intelligence,* 1–6.

Chaiken, S. (1980). Heuristic versus systematic information processing and the use of source versus message cues in persuasion. *Journal of Personality and Social Psychology*, 39(5), 752.

Chatterjee, P. (2011). Drivers of New Product Recommending and Referral Behaviour on Social Network Sites. *International Journal of Advertising*, 30(1), 77 –101.

Chevalier, J., & Mayzlin, D., 2006. The Effect of Word of Mouth on Sales: Online Book Reviews. *Journal Of Marketing Research*, 43(3), 345-354.

Chen, H., De, P., & Hu, Y. J., 2013. IT-Enabled Broadcasting in social media: An Empirical Study of Artists' Activities and Music Sales. *Available at SSRN 2201430*.

Cheung, C. M. K., M. K. O.Lee, and N.Rabjohn. 2008. The Impact of Electronic Word-of-mouth. *Internet Research*, 18(3), 229–247.

Cheung, M. Y., Luo, C., Sia, C.L., & Chen, H. (2009). Credibility of Electronic Word-of-Mouth: Informational and Normative Determinants of On-line Consumer Recommendations. *International Journal of Electronic Commerce*, 13(4), 9 – 38.

Chew, E. (2001). Modeling Tonality: Applications to Music Cognition. In *Proceedings of the Annual Meeting of the Cognitive Science Society*, 23(23).

Chintagunta, P., Gopinath, S., & Venkataraman, S., 2010. The Effects of Online User Reviews on Movie Box Office Performance: Accounting for Sequential Rollout and Aggregation Across Local Markets. *Marketing Science*, 29(5), 944-957.

Chu, S.-C., & Kamal, S. (2008). The Effect of Perceived Blogger Credibility and Argument Quality on Message Elaboration and Brand Attitudes: An Exploratory Study. *Journal of Interactive Advertising,* 8(2), 26–37.

Chu, S-C., & Kim, Y. (2011). Determinants of consumer engagement in electronic word-of-mouth (eWOM) in social networking sites. *International Journal of Advertising*, 30(1), 47-75.

Chung, K.H., and Cox, R.A. (1994). A stochastic model of superstardom: An application of the Yule distribution. *The Review of Economics and Statistics*. 76(4), 771-775.

Collier, G.L. (2007). Beyond valence and activity in the emotional connotations of music. *Psychology of Music*, 35(1), 110-131.

Correa, D.C., & Rodrigues, F.A. (2016). A survey on symbolic data-based music genre classification. *Expert Systems with Applications*, 60(2016), 190-210.

Crawford, E. 2016. Nielsen music year-end report U.S. technical report, Nielsen music

De Matos MG, Ferreira PA, Krackhardt D (2014) Peer influence in the diffusion of the iPhone 3G over a large social network. *MIS Quarterly* 38(4), 1103–1134.

Demetriou, A., Jansson, A., Kumar, A., & Bittner, R. (2018). Vocals in music matter: The relevance of vocals in the minds of listeners. In *Proceedings of International Society for Music Information Retrieval Conference*.

Defferrard M., Benzi K., Vandergheynst P. & Bresson X. 2017. FMA: A dataset for music analysis. In *18th International Society for Music Information Retrieval Conference, Suzhou, China*.

Dellarocas, C. (2003). The Digitization of Word of Mouth: Promise and Challenges of Online Feedback Mechanisms. *Management Science*, 49(10), 1407– 1424.

Dellarocas, C., Zhang, X., & Awad, N. F., (2007). Exploring the Value of Online Product Reviews in Forecasting Sales: The Case of Motion Pictures. *Journal of Interactive Marketing*, 21(4), 23-45.

Desmet, P., & Hekkert, P. (2007). Framework of Product Experience. *International Journal of Design*, 1(1), 2-10.

De Vany, A., & Walls, W., 1999. Uncertainty in the Movie Industry: Does Star Power Reduce the Terror of the Box Office? *Journal of Cultural Economics*, 23(4), 285-318.

Dewan, S., & Ramaprasad, J., 2013. Social Media, Traditional Media, and Music Sales: A Panel VAR Approach. *Working Paper, University of California, Irvine & McGill University, Montreal*.

Dewan, S., Ho, Y. & Ramaprasad, J. (2017). Popularity or Proximity: Characterizing the Nature of Social Influence in an Online Music Community. *Information Systems Research 28(1)*, 117-136.

Dhanaraj, R. and Logan, B. (2005). Automatic prediction of hit songs. In *Proceedings of International Society for Music Information Retrieval,* 488–491.

Dhar, V., & Chang, E., 2009. Does Chatter Matter? The Impact of User-Generated Content on Music Sales. *Journal of Interactive Marketing,* 23(4), 300-307.

Dichter, E. (1966). How Word-of-Mouth Advertising Works. *Harvard Business Review*, 16, 147– 166.

Duan W, Gu B, Whinston AB (2009) Informational cascades and software adoption on the Internet: An empirical investigation. *MIS Quart.* 33(1), 23–48.

Elberse, A., Eliashberg, J., & Vellaneuva, J. (2006). Polyphonic HMI: Mixing Music and Math. *Harvard Business School,* 9-508-009.

Fan, J., & Casey, M. (2013). Study of Chinese and UK hit songs prediction. In *Proceedings of International Symposium on Computer Music Multidisciplinary Research*, 640–652.

Fan, X., & Sun, J. (2012). Empirical study of the processes of internet word-of-mouth within an online community context. In *Proceedings of International Symposium on Management of Technology*, 624-629.

Fang, Y.-H. (2014). Beyond the credibility of electronic word of mouth: exploring eWOM adoption on social networking sites from affective and curiosity perspectives. *International Journal of Electronic Commerce*, 18(3), 67-101.

Faust, K. (1997). Centrality in affiliation networks. *Social Networks*, 19(1997), 157-191.

Feick, L., & Higie, R.A. (1992). The Effects of Preference Heterogeneity and Source Characteristics on Ad Processing and Judgments about Endorsers. *Journal of Advertising*, 21(2), 9–24.

Frieler, K., Jakubowski, K., & Müllensiefen, D. (2015). Is it the song and not the singer? Hit song prediction using structural features of melodies. *Yearbook of Music Psychology*, 41–54.

Frick, T., Tsekouras, D., and Li, T. (2014). The times they are a-changin: examining the impact of social media on music album sales and piracy. *7th ICT Conference Paris on Economics of Information and Communication Technologies.*

Gilly, M.C., Graham, J.L., Wolfinbarger, M.F., & Yale, L.J. (1998). A dyadic study of interpersonal information search. *Journal of Academy of Marketing Science*, 26(2), 83-100.

González-Rodríguez, M.R., Martínez-Torres, R., & Toral, S. (2016). Post-visit and pre-visit tourist destination image through eWOM sentiment analysis and perceived helpfulness. *International Journal of Contemporary Hospitality Management*, 28(11), 2609-2627.

Godes, D., & Mayzlin, D. (2009). Firm-Created Word-of-Mouth Communication: Evidence from a Field Test. *Marketing Science*, 28(4), 721– 739.

Greenberg, D.M., Kosinski, M., Stillwell, D.J., Monteiro, B.L., Levitin, D.J., & Rentfrow, P.J. (2016). The song is you: preferences for musical attribute dimensions reflect personality. *Social Psychological and Personality Science*, 7(6), 597-605.

Gruen, T. W., Osmonbekov, T., & Czaplewski, A.J. (2005). How E-communities Extend the Concept of Exchange in Marketing: An Application of the Motivation, Opportunity, Ability (MOA) Theory. *Marketing Theory*, 5(1), 33 – 49.

Hamlen, W.A. (1991). Superstardom in popular music. *The Review of Economics and Statistics (4),* 729-733.

Henry, P. (2005). Is the Internet Empowering Consumers to Make Better Decisions, or Strengthening Marketers' Potential to Persuade? *In Online Consumer Psychology. Understanding and Influencing Consumer Behavior in the Virtual World, edited by C. P.Haugtvedt, K. A.Machleit, and R. F.Yalch*, 345–360. Mahwah, NJ: Erlbaum.

Herremans, D., & Bergmans, T. (2017). Hit song prediction based on early adopter data and audio features. In *Late Breaking Demo at International Society for Music Information Retrieval Conference*.

Herremans, D., Martens, D., & Sörensen, K. (2014). Dance hit song prediction. *Journal of New Music Research*, 43(3), 291-302.

Hill, S.R., Troshani, I., and Chandrasekhar, D. (2020). Signalling effects of vlogger popularity on online consumers. *Journal of Computer Information Systems*, 60(1), 76-84.

Hillewaere, R., Manderick, B., & Conklin, D. (2014). Alignment methods for folk tune classification. In *Data analysis, machine learning and knowledge discovery* 369–377. Springer.

Hirschman, E. C., & Pieros, A. Jr. (1985). Relationships among indicators of success in Broadway plays and motion pictures. *Journal of Cultural Economics*, *9*(1), 35–63.

Hovland, C. I., I. L.Janis, and H. H.Kelley. 1953. Communication and Persuasion: Psychological Studies of Opinion Change. London: Oxford University Press.

Huang, J.H., & Chen, Y.F. (2006). Herding in online product choice. *Psychology & Marketing*, 23(5), 413-428.

Hwang, J., Park, S., & Woo, M. (2018). Understanding user experiences of online travel review websites for hotel booking behaviours: an investigation of a dual motivation theory. *Asia Pacific Journal of Tourism Research*. 359-372.

Ismagilova, E., Slade, E., Rana, N.P., & Dwivedi, Y.K. (2020). The effect of characteristics of source credibility on consumer behaviour: a meta-analysis. *Journal of Retailing and Consumer Services*, 53, https://doi.org/10.1016/j.jretconser.2019.01.005.

Jamil, R.A., & Hadnu, S.A.F. (2013). Consumer's reliance on word of mouse: Influence on consumer's decision in an online information asymmetry context. *Journal of Business Economics*, 5(2), 171-205.

Jansen, B., Zhang, M., Sobel, K., & Chowdury, A., 2009. Twitter Power: Tweets as Electronic Word of Mouth. *Journal of The American Society For Information Science & Technology*, 60(11), 2169-2188.

Juslin, P.N. (2009). 'Music (Emotional Effects)', in David Sander and Klaus R. Scherer (eds), *Oxford Companion to Emotion and the Affective Sciences* (Oxford and New York: Oxford University Press), 269–71.

Kao, K.C., Rao Hill, S., & Troshani I. (2017). Online consumers' responses to deal popularity as an extrinsic cue. *Journal of Computational Information Systems*, 57(4), 374-384.

Katz E, Lazarsfeld PF (1955) *Personal Influence* (Free Press, New York).

Karniouchina, E.V. (2011). Impact of star and movie buzz on motion picture distribution and box office revenue. *International Journal of Research in Marketing*, 28(1), 62-74.

Kayar, G., Sümer, T., Sotyürk, F., Doruk, G.E., & Cobanoğlu, C. (2019). Explore music data to enhance customer satisfaction. *E-review of Tourism Research*, 17(3), 444-451.

Kim, K., Yoon, S., & Choi, Y.K. (2019). The effect of eWOM volume and valence on product sales – an empirical examination of the movie industry. *International Journal of Advertising*, 37(3), 471-488.

Kitchenham, B., & Charters, S. (2007). Guidelines for performing systematic literature reviews in software engineering. *Technical Report EBSE-2007-01*, Keele University, Keele.

Kowald, D., Schedl, M., & Lex, E. (2020). The unfairness of popularity bias in music recommendation: a reproducibility study. In *European Conference on Information Retrieval 2020: Advances in Information Retrieval*, 35-42.

Kozinets, R.V., de Valck, K., Wojnicki, A.C., & Wilner, S.J.S. (2010). Networked Narratives: Understanding Word-of-Mouth Marketing in Online Communities. *Journal of Marketing*, 74, 71–89.

Kucukusta, D., Law, R., Besbes, A., & Legohérel, P. (2015). Re-examining perceived usefulness and ease of use in online booking: the case of Hong Kong online users. *International Journal of Contemporary Hospitality Management*, 185-198.

Lacher, K.T. (1989). "Hedonic Consumption: Music As a Product", in NA - Advances in Consumer Research Volume 16, eds. Thomas K. Srull, Provo, UT : Association for Consumer Research, Pages: 367-373.

Lazarsfeld, P. F., and R. K.Merton. 1954. Friendship as a Social Process: A Substantive and Methodological Analysis. In *Freedom and Control in Modern Society, edited by M.Berger, T.Abel, and C. H.Page,* 18–66. Princeton, NJ: Van Nostrand.

Lee, J., & Lee, J. S. (2015). Predicting music popularity patterns based on musical complexity and early stage popularity. In Proceedings of the 3rd Edition Workshop on Speech, Language & Audio in Multimedia, New York: ACM Press, 3-6.

Lee, S., Ha, S., and Widdows, R. (2011). Consumer responses to high-technology products: Product attributes, cognition, and emotions. *Journal of Business Resesarch*, 64(2011), 1195-1200.

Lincoln, A.E., & Allen, M.P. (2004). Double jeopardy in Hollywood: age and genders in the careers of film actors, 1926-1999. *Sociological Forum*, 19(4), 611-631.

Lis, B. (2013). In eWOM we trust a framework of factors that determine the eWOM credibility. *Business & Information Systems Engineering*, 5(3), 129-140.

Lowry, P.B., Gaskin, J., Twyman, N.W., Hammer, B., and Roberts, T.L. (2013). Taking 'fun and games' seriously: Proposing the hedonic-motivation system adoption model (HMSAM). *Journal of the Association for Information Systems*, 14(11), 617-671.

Luo, C., Luo, X., Xu, Y., Warkentin, M., & Sia, C.L. (2015) Examining the moderating role of sense of membership in online review evaluations. *Information & Management*, 52(3), 305-316.

Ma, Z., Sun, A., & Cong, G. (2013). On predicting the popularity of newly emerging hashtags in Twitter. *Journal of American Society for Information Science and Technology*, 64(7), 1399-1410.

MacInnis, D.J., & Jaworski, B.J. (1989). Information processing from advertisements: toward an integrative framework. *Journal of Marketing*, 53, 1-23.

Marsden, P. V., & Campbell, K. E. (1984). Measuring tie strength. *Social Forces*, 63, 482-501.

Marwick, A.E. (2011). I tweet passionately: twitter users, context collapse, and the imagined audience. *New Media Sociology*, 13(1), 114-133.

Mathys, J., Burmester, A.B., & Clement, M. (2016). aj. *International Journal of Research in Marketing*, 33(2), 428-448.

Mauch, M. & Dixon, S. (2010). Approximate note transcription for the improved identification of difficult chords. In *Proceedings of International Society for Music Information Retrieval*, 135–140.

McKay, C., & Fujinaga, I. (2004). Automatic genre classification using large high-level musical feature sets. In *Proceedings of the 5th international symposium on music information retrieval, Barcelona, Spain,* 1–6.

Medhat, W., Hassan, A., & Korashy, H. (2014). Sentiment analysis algorithms and applications: A survey. *Ain Shams Engineering Journal*, *5*(4), 1093–1113.

Metzger, M.J., Flanagin, A.J., & Medders, R.B. (2010). Social and heuristic approaches to credibility communication online. *Journal of Communication*, 60(3), 413-439.

Mohanty, S., Clements, V. & Gupta, V. (2018). Investigating the effect of eWOM in movie box office success through an aspect-based approach. *International Journal of Business Analytics, 5(1).* Doi: 10.4018/IJBAN.2018010101

Moran, G., & Muzellec, L. (2017). eWOM credibility on social networking sites: a framework. *Journal of Marketing Communications*, 23(2), 149-161.

Moretti, E. (2011). Social learning and peer effects in consumption: Evidence from movie sales. *Rev. Econom. Stud.* 78(1), 356–393.

Nielsen Company (2012b) Global consumers' trust in "earned" advertising grows in importance. http://www.nielsen.com/us/en/press-room/2012/nielsen-global-consumers-trust-in-earned-advertising-grows.html.

Nekmat, E., & Gower, K.K. (2012). Effects of disclosure and message valence in online word-of-mouth (eWOM) communication: implications for integrated marketing communication. *International Journal of Integrated Marketing Communications*, 4(1), 85-98.

North, A.C., Krause, A.E., Sheridan, L.P., & Ritchie, D. (2019). Popularity, mood, energy and typicality in music: a computerised analysis of 204,506 pieces. https://espace.curtin.edu.au/bitstream/handle/20.500.11937/69704/267433.pdf?sequence=2

North A.C., Shilcock A., & Hargreaves D.J. (2003). The effect of musical style on restaurant customers' spending. *Environment and Behavior*, 35(5), 712-718.

Nunes, J. C., & Ordanini, A. (2014). I like the way it sounds: The influence of instrumentation on a pop song's place in the charts. *Musicae Scientiae,* 18(4), 392-409.

Nunes, J. C., Ordanini, A., & Valsesia, F. (2015). The power of repetition: Repetitive lyrics in a song increase processing fluency and drive market success. *Journal of Consumer Psychology,* 25(2)*,* 187-199.

Nunn, H., & Biressi, A. (2010). 'A trust betrayed': celebrity and the work of emotion. *Celebrity Studies*, 1(1), 49-64.

Okoli, C., & Schabram, K. (2010). A guide to conducting a systematic literature review in information systems research. *Sprouts: Working Papers on Information Systems*, 10(26).

Pachet, F. (2012). Hit Song Science. In *Music Data Mining*, Chapman & Hall/CRC Boca Raton, 1ˢᵗ Edition, 305-326.

Pampalk, E., Dixon, S. & Widmer. G. (2003). On the evaluation of perceptual similarity measures for music. In *Proceedings of the Sixth International Conference on Digital Audio Effects (DAFx-03),* 7–12.

Pettijohn II, T.F., Williams, G.M., & Carter, T.C. (2010). Music for the seasons: seasonal music preferences in college students. *Current Psychology*, 29(4), 328-345.

Powell, J. How Music Works? Little, Brown and Company.

Porter, A., Bogdanov, D., Kaye, R., Tsukanov, R., & Serra, X. (2015). AcousticBrainz: a community platform for gathering music information obtained from audio. In *Proceedings of International Society for Music Information Retrieval Conference*.

Ren, J., & Kauffman, R.J. (2017). Understanding music track popularity in a social network. *Proceedings of the 25ᵗʰ European Conference of Information Systems ECIS,* 374-388.

Rook, D.W. (1987). The buying impulse. *Journal of Consumer Research*, 14(2), 189-199.

Saleem, A., & Ellahi, A. (2017). Influence of electronic word of mouth on purchase intention of fashion products on social networking websites. *Pakistan Journal of Commercial Social Sciences*. 11(2), 597-622.

Salganik, M.J., Dodds, P.S., & Watts, D.J. (2006). Experimental study of inequality and unpredictability in an artificial cultural market. *Science*, 311(5762), 854-856.

Salo, J., Lankinen, M., & Mäntymäki, M., 2013. The Use of Social Media for Artist Marketing: Music Industry Perspectives and Consumer Motivations. *JMM: The International Journal on Media Management*, 15(1), 23-41.

Sanchez, J. (2018). Algorithms and curated playlist effect of music streaming satisfaction (Unpublished Honors Dissertation). Department of Business Information Systems, Texas Christian University, Fort Worth, Texas.

Schindler, A., & Rauber, A. (2012). Capturing the temporal domain in echonest features for improved classification effectiveness. In *International Workshop on Adaptive Multimedia Retrieval*, 214-227.

Simonson, I., Carmon, Z., & O'Curry, S. (1994). Experimental evidence on the negative effect of product features and sales promotions on brand choice. *Marketing Science*, 13(1), 23-40.

Singhal, A., Sinha, P., & Pant, R. (2017). Use of deep learning in modern recommendation system: a summary of recent works. *International Journal of Computer Applications*, 180(7), 17-22.

Singhi, A., & Brown, D.G. (2014). Hit song detection using lyric features alone. In *Proceedings International Society for Music Information Retrieval Conference*.

Smith, D., Menon, S., & Sivakumar, K., 2005. Online Peer and Editorial Recommendations, Trust, and Choice in Virtual Markets. *Journal of Interactive Marketing*, 19(3), 15-37.

Sobhan, M.B. (2018). Classification of music based on correlation between mood, linguistic and audio features (Unpublished Master's Dissertation). Department of Computer Science and Engineering, BRAC University, Dhaka.

Stefani, G. (1987). Melody: a popular perspective. *Popular Music*, 6(1), 21-35.

Tekwani, B. (2016). Music mood classification using the million song dataset. https://www.researchgate.net/profile/Bhavika_Tekwani/publication/312087895_Music_Moo d_Classication_Using_The_Million_Song_Dataset/links/586ec72108ae8fce491c8f07.pdf

Thet, T. T., Na, J. C., & Khoo, C. S. (2010). Aspect-based sentiment analysis of movie reviews on discussion boards. *Journal of Information Science*.

Tirunillai, S., & Tellis, G., 2012. Does Chatter Really Matter? Dynamics of User-Generated Content and Stock Performance. *Marketing Science*, 31(2), 198-215.

van Kranenburg, P., Volk, A., & Wiering, F. (2013). A comparison between global and local features for computational classification of folk song melodies. *Journal of New Music Research, 42* (1), 1–18.

von Wangenheim, F., & Bayón, T. (2004). The effect of word of mouth on services switching: measurement and moderating variables. *European Journal of Marketing*, 38(9/10), 1173-1185.

Wang, Y. & Horvát, E. (2019). Gender differences in the global music industry: evidence from MusicBrainz and The EchoNest. In *Proceedings of the Thirteenth International AAAI Conference on Web and Social Media.*

Wathen, C.N., & Burkell, J. (2002). Believe it or not: factors influencing credibility on the web. *Journal of American Society of Information Science and Technology*, 53(2), 134-144.

Wirtz, J., & Chew, P. (2002). The Effects of Incentives, Deal Proneness, Satisfaction and Tie Strength on Word-of-Mouth Behaviour. *International Journal of Service Industry Management* 13(2), 141–162.

Yang, L-C., Chou, S-Y., Liu, J-Y., Yang, Y-H., & Chen, Y-A. (2017). Revisiting the problem of audio-based hit song prediction using convolutional neural networks. In *Proceedings of IEEE International Conference Acoustics, Speech and Signal Processing*, 621–625.

Yale, L.J., & Gilly, M.C. (1995). Dyadic perceptions in personal source information search. *Journal of Business Research*, 32(3), 225-237.

Yu, L-C., Yang, Y-H., Hung, Y-N., & Chen, Y-A. (2017) Hit song prediction for pop music by Siamese CNN with ranking loss. arXiv preprint arXiv:1710.10814.

Zafarani, R., Abbasi, M.A., & Liu, H. (2014). Social Media Mining.

Zangerle, E., Huber, R., Vötter, M., and Yang, Y-H. (2019). Hit song prediction: leveraging low- and high-level audio features. In *Proceedings of 20th International Society for Music Information Retrieval Conference*, Delft, The Netherlands.

Zufryden, F. S., 1996. Linking Advertising to Box Office Performance of New Film Releases – a Marketing Planning Model. *Journal of Advertising Research*, 36(4), 29-41.

Zhan, J., Gurung, S., & Parsa, S.P.K. (2017). Identification of Top-K Nodes in Large Networks using Katz Centrality. *Journal of Big Data*, 4(16), doi: 10.1186/s40537-017-0076-5

Zhang, W., and Watts, S. A. 2008. Capitalizing on Content: Information Adoption in Two Online Communities. *Journal of the Association for Information Systems, 9(2),* 73–94.

8. Appendices

8.1 Appendix A

Definitions of all the musical terminologies discussed in Chapter 2, Section 2.1

Tempo: Beats per unit time in a musical track (Pampalk et al., 2003)

Tonality: The characteristic which determines the extent to which the instrument or voice has hit the correct note (Chew, 2001).

Danceability: The measure ranging from 0 to 1 that indicates how much the track stimulates people to dance on the basis of tempo, periodicity of beats, rhythmic stability, and strength of beats. The values closer to 1 indicates the track is more suitable for dance.

Timbre and MFCC: MFCC measures the timbral aspects of music (Dhanaraj and Logan, 2005). Basically, it represents the spectrum which is nothing but the manifestation of the shape of our vocal tract.

Melody: The characteristic of music that makes it sweet, brings ease on ears while listening, and involving emotions (Stefani, 1987).

8.2 Appendix B

Hello members of "*******",

You are requested to fill this questionnaire. This would ideally take you not more than 7-10 minutes. This is a questionnaire about your perceptions on the other group members. Therefore, I respect your confidentiality. I can guarantee you that I, Sanlap Acharya, is the only one who can see your responses. You need not mention your name anywhere. Also, by no means, your responses will be disclosed anywhere (not within or outside the group).

All the questions can have more than one answers. In fact, sufficient space is provided for you so that you can put any number of names, separating them by comma, that you find suitable for the question. There is no restriction on the number of answers you can enter for each question.

This is a voluntary questionnaire. If at any point, you have any doubt, feel free to ask me that. If at any point, while filling the questionnaire, you feel uncomfortable, you may leave the survey.

Please fill in all the questions in the questionnaire to complete the survey.

Perceived Expertise (Feick and Higie, 1992, α = 0.86)

1. In this group, who do you think listens to a lot of music?
2. In this group, who do you think have good aesthetic sense about music?
3. In this group, who do you think have immense theoretical knowledge about music?
4. In this group, who do you think are good singers?
5. In this group, who do you think know a lot about singers?

Perceived Homophily (similarity in tastes and preferences) (Feick and Higie, 1992, α = 0.9)

1. In this group, with whom do you share similar aesthetic values and beliefs about music?

2. In this group, who do you think share a healthy discussion about music?

3. In this group, with whom do you have similar tastes and preferences about music?

Perceived Friendship (Marsden and Campbell, 1994, α = 0.92)

1. In this group, with whom are you most closely attached personally?

2. In this group, who you want to please?

3. In this group, who would you ask for help if you have any problem?

4. In this group, who do you trust?