Lecture Notes in Social Networks

Series editors

Reda Alhajj, University of Calgary, Calgary, AB, Canada
Uwe Glässer, Simon Fraser University, Burnaby, BC, Canada

Advisory Board

Charu C. Aggarwal, IBM, T.J. Watson Research Center, Hawthorne, NY, USA
Patricia L. Brantingham, Simon Fraser University, Burnaby, BC, Canada
Thilo Gross, University of Bristol, Bristol, UK
Jiawei Han, University of Illinois at Urbana-Champaign, IL, USA
Huan Liu, Arizona State University, Tempe, AZ, USA
Raul Manasevich, Universidad de Chile, Santiago, Chile
Manasevich Anthony J. Masys, Centre for Security Science, Ottawa, ON, Canada
Carlo Morselli, University of Montreal, QC, Canada
Rafael Wittek, University of Groningen, The Netherlands
Daniel Zeng, The University of Arizona, Tucson, AZ, USA

More information about this series at http://www.springer.com/series/8768

Sorin Adam Matei • Brian C. Britt

Structural Differentiation in Social Media

Adhocracy, Entropy, and the "1 % Effect"

Springer

Sorin Adam Matei
Purdue University
West Lafayette, IN, USA

Brian C. Britt
South Dakota State University
Brookings, SD, USA

ISSN 2190-5428 ISSN 2190-5436 (electronic)
Lecture Notes in Social Networks
ISBN 978-3-319-64424-0 ISBN 978-3-319-64425-7 (eBook)
DOI 10.1007/978-3-319-64425-7

Library of Congress Control Number: 2017948031

© Springer International Publishing AG 2017
This work is subject to copyright. All rights are reserved by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.
The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.
The publisher, the authors and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, express or implied, with respect to the material contained herein or for any errors or omissions that may have been made. The publisher remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Printed on acid-free paper

This Springer imprint is published by Springer Nature
The registered company is Springer International Publishing AG
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

Acknowledgments

This book is the product of a long journey. Although there are only two authors on the cover, the book and the projects behind it are the product of a true fellowship. We are in debt to the many people and many organizations that made this book possible. First, we would like to thank Purdue University and the National Science Foundation, specifically those officers, administrators, and anonymous reviewers and colleagues who believed in our project and in our work. Several Purdue grants, including those awarded by the College of Liberal Arts, by the Purdue Research Foundation, by the Office of the Vice President for Research, and by Discovery Park, made this book possible, and the NSF award BCS 1244708 was instrumental in bringing this project to fruition.

Among the many individual people who selflessly supported this book, we need to first acknowledge Elisa Bertino, the head of the Purdue University Cyber Center and a mentor for us all in grant writing and research design. Luca de Alfaro, from the University of California, Santa Cruz, graciously shared the core data set of Wikipedia revisions for the 2001–2010 interval with us, including a core metric for effort at the revision level. We have also benefitted from support from our colleagues, Michael Zhu and Chuanhai Liu, as well as from their graduate student, Wutao Wei. Another of our colleagues, David Braun, and our graduate students, David Lazer and Azat Khairov, also contributed a good amount of effort through various channels, including the Discovery Park Internship Programs. Serendipity Labs, in Chicago, was the place where this volume took shape, and the hospitality of this co-working space and of its manager, Andreas Brandl, should also be mentioned.

We are also in debt to our families and friends who listened to our presentations and encouraged us along the way. These individuals are too numerous and their support too great to properly detail here, but this volume, and the years of work that culminated in it, would not have been possible without their love and the strength that they gave us.

Contents

1 Introduction 1
1.1 Inequality in Online Groups 1
1.2 Theoretical Starting Points 3
1.3 Problem Significance 5
1.4 Research Strategy 7
1.5 Theoretical Perspective 8
1.5.1 Inequality and Evolutionary Processes 8
1.5.2 Adhocracy: Social Mobility Moderates Inequality 11
1.5.3 Wikipedia as a Site of Investigation: Significance, Research Review, and Data 13
References 15

Part I Structural Differentiation and Social Media: Theoretical Framework

2 Macro-Structural Perspectives on Social Differentiation and Organizational Evolution in Online Groups 21
2.1 Introduction 21
2.2 Human Sociability: Possible Definitions 22
2.3 Sociability and Structural Differentiation 24
2.4 Online Sociability and Structural Differentiation: Connections and Directions of Study 27
References 28

3 Specifying a Wikipedia-Centric Explanatory Model for Online Group Evolution and Structural Differentiation 31
3.1 Introduction 31
3.2 Volunteering and Social Inequality 32
3.3 Why Inequality Matters 33
3.4 Social Roles and Structural Differentiation 34
3.5 Research Questions 40
References 41

4 Social Structuration Online: Entropy and Social Systems 45
4.1 Introduction 45
4.2 Diversity and Social Entropy: A Neglected Tradition 47
4.3 Wikipedia 50
4.4 Determinants of Structuration 53
4.5 Conceptual Underpinning 54
4.5.1 Social Entropy as a Measure of Diversity and Equality 56
4.5.2 Normalized Social Entropy as a Diversity/Equality Measure 58
4.6 Using Entropy to Study Online Collaborative Systems such as Wikipedia 60
4.7 What Have We Learned So Far? 64
References 65

5 Analytic Investigation of a Structural Differentiation Model for Social Media Production Groups 69
5.1 Introduction 69
5.2 Methods 70
5.2.1 Data 70
5.2.2 Overall Analysis Strategy 72
5.2.3 Descriptive Exploration 73
5.2.4 Inferential Analysis 76
5.3 Looking Back, Looking Forward 82
References 84

Part II Configurational Change Phases and Motors in Online Collaboration

6 The Foundations of a Theoretical Model for Organizational Configurations and Change in Online Collaborative Processes 87
6.1 Introduction 87
6.2 Toward a Theoretical Explanatory Model of Organizational Change in Online Collaborative Structures 88
6.3 Configurational Change: Critical Theoretical Gap and Bridges 89
6.4 Conclusion 92
References 93

7 Organizational Configurations and Configurational Change 97
7.1 Introduction 97
7.2 Organizational Configurations 97
7.2.1 Configurations and Archetypes 97
7.2.2 Mintzberg's Configurational Array 99
7.3 Configurational Change 101
7.3.1 Configurations and Change in Virtual Organizations 101
7.3.2 Evolutionary and Revolutionary Change 104
7.3.3 Pinpointing Configurational Evolution and Revolution 105
7.4 Conclusion 109
References 110

8 A Synthesized Theoretical Framework for Motors Driving Organizational Configurational Change 113
8.1 Introduction 113
8.2 Organizational Change Motors 113
8.2.1 Organizational Change Motor Typology 113
8.2.2 Configurational Change Motors 117
8.3 Practical Implications 118
8.3.1 Identifying Existing Informal Configurations 118
8.3.2 Influencing Informal Configurations 119
8.3.3 Inciting Formal Configurational Change 121
8.4 Conclusion 123
References 123

9 Wikipedia Evolution: Trends and Phases 125
9.1 Introduction 125
9.2 Configurational Phase Shifts: Criteria and Significance 126
9.3 Existing Breakpoint Detection Algorithms 127
9.4 Stepwise Segmented Regression Analysis 129
9.5 Breakpoints as Revolutionary Change 130
9.5.1 Simple Structure or Entrepreneurial Organization 132
9.5.2 Machine Bureaucracy 132
9.5.3 Professional Bureaucracy 133
9.5.4 Diversified Organization 133
9.5.5 Adhocracy 134
9.5.6 Classification of Archetypes 135
9.6 Analysis 136
9.7 The Path Toward Adhocracy 140
9.8 Conclusion 141
References 142

10 Breakpoints and Concurrent Factors 143
10.1 Introduction 143
10.2 Identifying Concurrent Factors and Change Modalities 145
10.2.1 First Breakpoint: Week 7 146
10.2.2 Second Breakpoint: Week 42 147
10.2.3 Third Breakpoint: Week 54 147
10.2.4 Fourth Breakpoint: Week 92 149
10.2.5 Fifth Breakpoint: Week 142 149
10.2.6 Sixth Breakpoint: Week 204 150
10.2.7 Seventh Breakpoint: Week 250 150
10.2.8 Eighth Breakpoint: Week 335 151
10.3 Systematic Overview of the Factors Shaping Wikipedia's Evolution 152
10.4 Conclusion 160
References 162

Part III Future Theoretical and Practical Directions

11 Conclusions 167
11.1 Overall Narrative 167
11.2 Elites and Social Structuration 168
11.3 Looking Forward: Wisdom of the Differentiated Crowd 171
11.4 The Fallacy of the Mini-Wikipedia 171
11.5 Embracing Revolution 172
11.6 Interchangeable, Irreplaceable Leaders 174
11.7 Structures and Structuration Through an Entropy Lens: What Is the Optimal Range? 175
References 178

Appendix A: Data Collection, Management, Preprocessing, and Analysis 179

Appendix B: Historical and Media Analysis of Wikipedia's Evolutionary Context 227

Appendix C: Advantages and Disadvantages of Stepwise Segmented Regression Analysis 245

About the Authors

Sorin Adam Matei is a Professor, Brian Lamb School of Communication, Purdue University. Dr. Matei studies the emergence of new forms of sociability online. His papers and books examined the emergence of social capital online, the effect of offline sociability online on online relationships, and the generation of trust and authority in knowledge markets. His work was funded by the National Science Foundation, Kettering Foundation, and Mellon Foundation.

Brian C. Britt Assistant Professor, Department of Journalism and Mass Communication, South Dakota State University. Dr. Britt is a computational social scientist who focuses on the intersection between organizational communication and new media, with a particular emphasis on the strategies employed by individuals positioning themselves in online organizations. His work has been funded by the National Science Foundation and the National Institutes of Health and has resulted in several book chapters in edited volumes.