

Table of Contents

1	Introduction	1
2	Visualization	3
2.1	Visualization Technology	3
2.2	Information Visualization	4
3	Visualization of Scientific Information and Domain Analysis.....	7
3.1	Domain Analysis	7
3.2	Social Networks.....	12
3.2.1	Basic Notions.....	13
3.2.2	Concept of Social Network.....	21
3.2.3	Brief Historical Review	21
3.2.4	Social Network Analysis	24
3.3	Scientography.....	26
3.4	Scientography and Domain Analysis	27
4	Methodological Aspects Previous to Scientography	29
4.1	Gathering Information	29
4.2	Unit of Analysis.....	30
4.3	Units of Measure.....	31
4.3.1	Document Cocitation.....	32
4.3.2	Author Cocitation	33
4.3.3	Journal Cocitation.....	34
4.3.4	Cocitation of Classes and Categories	35
4.4	Reduction of the n -Dimensional Space	37
4.4.1	Multivariate Analysis Methods.....	37
4.4.2	Connectionist Techniques.....	44
4.4.3	Techniques Based on Social Networks.....	46
4.5	Spatial Distribution of Information.....	50
4.5.1	The Kamada–Kawai Algorithm.....	51
4.5.2	The Fruchterman and Reingold Algorithm.....	52
4.5.3	Algorithm Evaluation	53

4.6	Information Visualization.....	54
4.6.1	Scalable Vector Graphics (SVG).....	54
4.6.2	Advantages of SVG as a Representation Format.....	55
5	Material Used	57
5.1	Data Extraction	59
5.2	Data Analysis and Treatment.....	59
5.2.1	Normalization of Journal Titles.....	59
5.2.2	Multidisciplinarity of Journal Contents	60
5.2.3	Author Control.....	60
5.3	Generation of the Secondary Source	61
6	Methodology.....	63
6.1	Category Cocitation	63
6.1.1	Latent Cocitation	64
6.1.2	Raw Cocitation Values	65
6.2	Dimensional Reduction: The Basic Structure of a Domain.....	66
6.3	Spatial Distribution of Information.....	71
6.4	Methodological Considerations	74
6.4.1	Weak Links.....	74
6.4.2	Isolated Nodes	77
6.4.3	Information Retrieval	78
6.5	Domain Visualization	79
6.5.1	Evaluation.....	80
6.6	Scientography of Large Scientific Domains	83
6.7	Intercitation.....	83
6.7.1	Journal Intercitation.....	85
6.7.2	Intercitation of Documents	87
6.7.3	Intercitation Versus Domain Scientograms	89
6.8	Analysis and Comparison of Domains	90
6.8.1	Intellectual Groupings	92
6.8.2	Analysis of a Domain	94
6.8.3	Domain Comparisons	96
6.8.4	Evolution of a Domain	98
7	Results	99
7.1	Scientography and Analysis of the World, 2002	99
7.1.1	Scientogram.....	99
7.1.2	Factor Analysis	104
7.1.3	Analysis of a Domain	124

7.2	Scientography and Comparison of Domains	143
7.2.1	Scientograms	143
7.2.2	Factor Analysis	153
7.2.3	Domain Comparison.....	160
7.3	Scientography and the Evolution of Domains	178
7.3.1	Scientograms.	182
7.3.2	Factor Analysis	196
7.3.3	Evolution of a Domain	203
7.3.4	Backbone	231
8	Discussion.....	235
8.1	Importance and Quality of Results	235
9	Epilogue.....	241
	Annex I.....	245
	Annex II.....	255
	Annex III.....	267
	Annex IV	279
	Annex V.....	293
	Bibliography	303



<http://www.springer.com/978-3-540-69727-5>

Visualizing the Structure of Science
Vargas-Quesada, B.; de Moya-Anegón, F.
2007, VIII, 312 p. 83 illus., Hardcover
ISBN: 978-3-540-69727-5