Anne Beaulieu & Sabina Leonelli



A Critical Introduction



CONTENTS

List of Figures and Table						
Data Stories						
Ab	About the Authors Acknowledgements					
Ac						
Οι	Overview of the Book					
Int	roduc	tion	xvii			
Pa	ırt I	Data in Society	1			
1	Data in Society		3			
	1.1	Introduction: Who cares about data?	3			
	1.2	Datafication and its components	6			
	1.3	Data, ethics and knowledge production	10			
	1.4	Conclusion: The impact of Datafication	13			
Pa	rt II	Data Creation	15			
2	Big Data in Context		21			
	2.1	Introduction: The rise of Big Data	21			
	2.2	The Big Data mythology: Data transforms society	25			
	2.3	A historical perspective: Society transforms data	28			
	2.4	Conclusion: Data do not speak for themselves	32			
3	Characteristics of Data		35			
	3.1	Introduction: Data do not stay still	35			
	3.2	Data are not neutral	40			
	3.3	Data are context-dependent	46			
	3.4	Conclusion: Characteristics of data	48			
4	Data, Evidence and Knowledge					
	4.1	Introduction: The representational and the relational views				
	4.3	on data	52			
	4.2	What is evidence? The path from data to knowledge	55 57			
	4.3 4.4	Examples of data within the knowledge production cycle	57 50			
	4.4	Contrasting the representational and relational perspectives	59 62			
	4.5	Conclusion: Data science in a relational perspective	02			

DATA AND SOCIETY

Part III		Data Circulation	65
5 Putting Data to Work		g Data to Work	73
	5.1	Introduction: The complexity of putting data to work	74
	5.2	The challenge of 'messy' data	75
	5.3	Infrastructures	77
	5.4	Conventions and metadata	81
	5.5	Models	84
	5.6	Visualisations: Forms, tools and interfaces	87
	5.7	Curation	91
	5.8	Conclusion: Forms of data work	93
6	New Data Skills		94
	6.1	Introduction: Data expertise	94
	6.2	What is data science?	95
	6.3	Data science skills	101
	6.4	Bringing skills together	107
	6.5	Conclusion: Becoming a data scientist today	113
7	Governance of Data Journeys		116
	7.1	Introduction: What is data governance?	117
	7.2	Data as private commodities: Closed data	119
	7.3	Data as public goods: Open data	122
	7.4	A hard case: The journeys of health-related data	125
	7.5	Shifting focus to usable data: The FAIR principles	129
	7.6	International data journeys and the problem of	
		data inequities	131
	7.7	Conclusion: Governance is not a silver bullet	134
Pa	rt IV	Data Value, Innovation and Responsibility	135
8	Data as a Source of Value		143
	8.1	Introduction: What makes data valuable?	144
	8.2	Assumptions about the value of data	145
	8.3	Data and innovation	147
	8.4	The data economy	149
	8.5	Who benefits from the value of data?	152
	8.6	Allocating value, responsibility and profit	154
	8.7	How does AI add value to data?	156
	8.8	The value of prediction	159
	8.9	The value of metrics	160
	8.10	Conclusion: Making data valuable	161

CONTENTS

9	Data .	lustice and Ethics	163
	9.1	Introduction: From data value to data ethics	164
	9.2	Which data are ethically sensitive?	165
	9.3	Data justice: Implementing fairness	168
	9.4	Ethics for data work: General frameworks	172
	9.5	Ethics in data work: Assessing technical decisions	175
	9.6	Responsibilities of data workers	178
	9.7	Conclusion: From analysis to action, from rules to power	182
10	Respo	nsible Use of Data as Evidence	184
	10.1	Introduction: Data matters	185
	10.2	What is evidence-based decision making?	187
	10.3	Ensuring responsible use of data	191
	10.4	Legal frameworks and formal regulation	192
	10.5	Codes of conduct	194
	10.6	Computational metrics and design	195
	10.7	Organisational and cultural interventions	197
	10.8	Institutional Review Boards	198
	10.9	Social participation and slow science	199
	10.10	Conclusion: Responsibility, monitoring and trust	201
Pa	rt V	Conclusion: Data and the Knowledge We Need	203
11	Towar	ds Good Data Science	211
	11.1	Lesson 1: 'Data' is a relational category	212
	11.2	Lesson 2: Infrastructures and data stewardship are	
		essential to extract knowledge from Big Data	212
	11.3	Lesson 3: Data workers must use data sources with	
		discernment and be aware of the risks of discrimination	
		and inequality connected to data	213
	11.4	Lesson 4: Ethics, security and social responsibility are	_
		a fundamental part of data work	215
	11.5	Lesson 5: Responsible data work requires social dialogue,	
		community engagement and contributions to data literacy	216
Glo	ssary		218
References			221
Index			240



LIST OF FIGURES AND TABLE

Figures

1.1	Engagement with data: different roles of data workers that often intersect	é
1.2	A model of the spheres of datafication	8
3.1	The broad dynamic of a data journey, with data shifting from sites of data creation to sites of mobilisation and	
	interpretation	37
3.2	Stages of a data journey across sites	38
3.3	Penetration of different information and communication technologies	42
3.4	Photo as evidence, known in the collection as: The governor of Ceram/Seram, while on a tour through Talseti Bay	47
4.1	A representational view of data	52
4.2	The cycle of knowledge production according to the relational view on data	55
4.3	Data-to-wisdom pyramid model	60
	The steps of data journeys in data science superimposed on the	
	model of the research process	63
5.1 5.2	A data model for data on hiring in a private company Conventions of visualisation shape the contents: the	85
	icon of genius is visually related to the icon of maleness	89
6.1	Data science as composite	99
6.2	Another version of data science as a Venn diagram	100
6.3	Data work as conceptualised at one of the author's workplaces	101

Table

6.1 Components of a data science project on traffic patterns, divided by tasks, primary expertise and main skills required

108

