The structure and dynamics of scholarly networks between the Dutch Republic and the Grand Duchy of Tuscany in the 17th century

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Introduction

In recent years, the theoretical approaches of social network analysis have already made an impact in the historical field.[2] Specifically, the Republic of Letters, the pan-European intellectual community of the sixteenth, seventeenth and eighteenth century, has been the subject of a rich interdisciplinary historiography for the past few decades. But although this letter-writing community has attracted more and more scholarly attention in conjunction with a global turn in the practice of the digital humanities, the study of networks in historical research remains a field in its infancy. It has yet to establish its methodology, its ontologies, the best digital tools, and even the language by which we invoke technical processes in the study of early modern history. Rarely do historical studies offer an actual implementation and testing of how the mathematical tools employed by network scientists offer valuable ways of understanding and exploring the past. Most studies underline the potential utility of network metrics, but leave their exploration for future research.[3] To add to this conceptual murkiness, the use of digital tools is often looked upon in a suspicious way, considered to be too simplistic and hence unsuitable to deal with the complexity and uncertainty of historical sources.[4] There is, as underlined by Ruth Ahnert and Sebastian Ahnert, "still much work to be done before statistical methods are embedded within the literary historian's toolbox".[5] We need, therefore, to continue to sharpen our digital tools and experiment with network models that give nuance, subtilty and detail to historical data.

This study attempts to take up this challenge and to demonstrate how social network analysis enables us to advance the cause of historical inquiry. It will address this challenge by exploring the ways in which early modern scholars capitalized on opportunities in the social structure to which they were connected. Accordingly, much of the essence of this study focuses on methodology rather than historical narrative. We might even say that this study has an experimental character in nature. Specifically, we will take a look at how early modern networks were actively and consciously constructed, modified, questioned and navigated by early modern scholars. They were constantly monitoring their interactions with one another in making decisions. On the one hand, early modern scholars were expected to

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[2] See Ruth Ahnert and Sebastian E. Ahnert, 'Protestant Letter Networks in the Reign of Mary I: A Quantitative Approach', *ELH* 82, no. 1 (2015): cit. 2. For many other examples, see the extensive bibliography maintained by Marten Düring, 'HNR Bibliography', *Historical Network Research* (blog), last accessed 6 February 2019 http://historicalnetworkresearch.org/bibliography/. See also, Marten Düring et al., *Handbuch Historische Netzwerkforschung: Grundlagen und Anwendungen.* (Berlin: LIT Verlag, 2016).

[3] Daniel Stolzenberg, for example, states the following: "In the future it may be possible to create digital maps of early modern scholarly communication that integrate letters and books in a unified web. Until then, we must not lose sight of what the new digital methods leave out, lest a partial but useful perspective becomes a misleading and distorted one", quoted in 'A Spanner and His Works: Books, Letters, and Scholarly Communication Networks in Early Modern Europe', in *For the Sake of Learning: Essays in Honor of Anthony Grafton*, ed. Ann Blair and Anja-Silvia Goeing (Leiden & Boston: Brill, 2016), cit. 172. Moreover, Charles van den Heuvel has aimed to set out the "requirements for the future development of digital intellectual and technological geographies and to combine these with network representations of actors and documents relevant for the history of knowledge exchange in Early Modern Europe", see 'Mapping Knowledge Exchange in Early Modern Europe: Intellectual and Technological Geographies and Network Representations'. *International Journal of Humanities and Arts Computing* 9, no. 1 (2015): cit. 95. In another co-authored article, Van den Heuvel, discussed several hypotheses needed to analyze the content of letters and which can be tested "once sufficient material is digitized", see Charles van den Heuvel et al., 'Circles of Confidence in Correspondence. Modeling Confidentiality and Secrecy in Knowledge Exchange Networks of Letters and Drawings in the Early Modern Period', *Nuncius* 31, no. 1 (2016): 79-80 (cit. 90).

[4] Lorraine Daston well describes this suspicious attitude towards the application of sociological models to history, writing that "models of human conduct are frankly imperialistic in their aims. But insofar as there has been any humanistic response to them, it has been a rolling of eyes heavenward and a shrugging of shoulders about the absurdity of it all", in 'Whither Critical Inquiry?', *Critical Inquiry* 30, no. 2 (2004): 361. For a discussion related to skepticism about the Digital Humanities, see Dan Edelstein et al., 'Historical Research in a Digital Age: Reflections from the Mapping the Republic of Letters Project. Historical Research in a Digital Age', *The American Historical Review* 122, no. 2 (1 April 2017): 400–424.

[5] Ahnert and Ahnert, 'Protestant Letter Networks in the Reign of Mary I: A Quantitative Approach', cit. 2.

contribute towards the achievement of the collective goals of the Republic of Letters – the *bonum commune* – that rested on the imperative of sharing knowledge without frontiers. Nevertheless, they had to deal with many tensions and inefficiencies at a time in which the freedom of communication was not always guaranteed. These tensions ranged from restrictions imposed by the Inquisition to scholarly rivalries, jealousy and competition. As a consequence, it seems that the citizens of the Republic of Letters often found themselves between extremes, struggling to find a balance in dealing with these tensions. They had to strategically negotiate between open and closed circles in their networks, between friendly and hostile relationships and between openness and secrecy in their communication.

To explore these dynamics, this study focuses on the epistolary contacts between scholars from the Grand Duchy of Tuscany and the Dutch Republic during the reign of Cosimo III (1670-1723), a period that is characterized by an ever-increasing amount of interchange between the two respective societies. The lively epistolary exchange between these two societies allows for a comprehensive view on the supra-confessional Republic of Letters, providing a framework to grasp the sometimes conflicting dynamics in the sharing of knowledge. The opposed religious and social paradigms between these two areas might have influenced the choices people had to make, and the strategies they adopted to achieve or ignore coordination on an international scale. In fact, scholars had to deal with many tensions between Italy (with its organized control of ideas and consequent suppression of anything that transgressed the boundaries defined by the Church) and the Dutch Republic, often referred to as an area with relative tolerance and freedom of expression.[6]

This study consists of six chapters which contents can be broken down into two parts. The first part consists of three introductory chapters that provide background and an historical context to the relations between Tuscany and the Dutch Republic during the reign of Cosmo III. The first chapter discusses that secrecy and confidentiality were needed to foster the exchange between the Dutch Republic and the Grand Duchy of Tuscany. The second chapter focuses on the travels of prince Cosimo in the Dutch Republic in the years 1667-1669 – an experience that has undoubtedly aroused his interest to maintain close contact with the Dutch country. The third chapter turns the relationship around and discusses the stream of Dutch travelers who made their way to the Grand Duchy of Tuscany. The favorable attitude Cosimo III had towards them attracted several Dutch scholars, who came to Florence with the prospect of consulting the rich manuscript collections in the Medici libraries. Furthermore, the Dutch scholars valued the opportunity such visits afforded to meet Cosimo's legendary librarian Antonio Magliabechi (1633-1714).

Shortly after the return of Cosimo from his grand tour in the Dutch Republic and the death of his father Ferdinando II, he ascended the grand ducal thrown in 1670 at the age of 28 years. Cosimo's journey to the Dutch Republic had made a great impact on him. The Grand Dukes fascination for the Dutch culture seems to have been fuelled by his conviction that the Dutch Republic could guarantee profit for the Grand Duchy in every aspect possible. During his visit in the Dutch Republic, he visited publishing houses, cabinets of curiosities, the headquarters of the East and West Indian Trading

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[6] For a discussion of the general theme of tolerance in the Dutch Republic, see Christiane Berkvens-Stevelinck, Jonathan Irvine Israel and G.H.M. Posthumus Meyjes, eds., *The Emergence of Tolerance in the Dutch Republic* (Leiden/Boston: Brill, 1997); Christine Kooi, 'Religious Tolerance', in *The Cambridge Companion to the Dutch Golden Age*, ed. Helmer J. Helmers and Geert Janssen (Cambridge: Cambridge University Press, 2017), 208-224; Jo Spaans, 'Religious policies in the seventeenth-century Dutch Republic', in *Calvinism and Religious Toleration in the Dutch Golden Age*, ed Ronnie Po-chia Hsia and Henk van Nierop (Cambridge: Cambridge University Press, 2002), 72-86; Andrew Pettegree, 'The politics of toleration in the Free Netherlands, 1572-1620', in *Tolerance and intolerance in the European Reformation*, ed. Ole Peter Grell and Bob Scribner (Cambridge: Cambridge University Press, 1996), 182-198; Luisa Simonutti, 'Looking beyond home shores: Dutch tolerance at the end of the seventeenth century', *History of European Ideas* 44, no. 8 (2018): 1092-1110; *Ibidem, Arminianesimo e Tolleranza nel Seicento Olandese* (Florence: Olschki, 1984).

companies, churches and fortifications, observed the workings of windmills, dykes and polders and established contact with a large portion of the intellectual and mercantile life in the Dutch Republic. Cosimo used this network to help Tuscany profit economically, technologically and culturally to the fullest extent possible. This fascination for the Dutch culture has been underlined by Andrew McCormick and Henk Th. van Veen, who argued that the "Dutch influence on Tuscany had never been, and would never be, so great, thanks to Cosimo's fascination with practically every aspect of Dutch culture and society".[7] This claim raises the question of how you can actually determine this influence. Network analysis, as I will demonstrate in this study, can play a role in this regard.

To foster and strengthen his relationships with the Dutch, Cosimo primarily relied on the administrative techniques and methods of learning handled by two principal figures at the Medici court: the grand ducal secretary Apollonio Bassetti (1631-1699) and the court librarian Antonio Magliabechi (1633-1714). The co-existence of two such powerful men at the service of Cosimo III favored a substantial increase of correspondence and interchange between the Dutch Republic and his court in Tuscany, Florence in the second half of the seventeenth century. While the eighteenth-century historian Riguccio Galluzzi had flattened Cosimo's reign to the level of mere bigotry, he recognized the important role of Bassetti and Magliabechi. According to Galluzzi, it was difficult for a man of Bassetti's brilliance to receive the goodwill and support of the Grand Duke, who only "loved blind dependence and adulation".[8] He considers Bassetti as the mastermind behind Cosimo's efforts to curb the seemingly, yet inevitable decline of Tuscany. Likewise, Magliabechi "who was admired by the literary world" made Florence a hub for scholarly correspondence and book circulation.[9]

The first three chapters serve as the framework for the following chapters, in which the focus lies on the complexity of models used for assessing the networked structure of the relations between the Dutch Republic and the Grand Duchy of Tuscany. To do so, this study draws inspiration from a main body of social theory, namely graph theory, or social network theory. Graph theory highlights the constitutive importance of social networks in the context of the Republic of Letters, a field where much remains to be done and which will continue to stimulate us for many years to come.

1. THE DIGITAL REPUBLIC OF LETTERS

This study is intricately connected with one of the greatest themes of history: the Republic of Letters. In the 1970s, a number of scholars began to investigate the nature and meaning of the Republic of Letters. According to Dan Edelstein et al. "an international community of scholars has developed and defined this subject in the decades since, tracing the rise and decline of this ideal society and its real connection to cultural and intellectual practices and scholarly communities".[10] The Republic of Letters was the self-

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[7] Henk Th. van. Veen and Andrew P. McCormick, *Tuscany and the Low Countries: An Introduction to the Sources and an Inventory of Four Florentine Libraries* (Florence: Centro Di, 1984), 62.

[8] Riguccio Galluzzi, *Istoria del Granducato di Toscana sotto il governo della casa Medici*, vol. VII (Florence: Stamperia Vignozzi, 1781), 83-85.

[9] Galluzzi, 274, "che facea l'ammirazione del mondo letterario".

[10] Edelstein et al., 'Historical Research in a Digital Age: Reflections from the Mapping the Republic of Letters Project. Historical Research in a Digital Age', cit. 410. For more about the history of the Republic of Letters, see, Lorraine Daston, 'The Ideal and Reality of the Republic of Letters in the Enlightenment', *Science in Context* 4, no. 2 (1991): 367-386; Hans Bots, *Republiek der letteren: Ideaal en werkelijkheid: Rede uitgesproken bij aanvaarding van het ambt van buitengewoon hoogleraar aan de Katholieke universiteit te Nijmegen* (Amsterdam: Apa-Holland universiteits Press, 1977); *Ibidem, De Republiek der Letteren. De Europese Intellectuele Wereld 1500-1760* (Nijmegen: Van Tilt, 2018). Françoise Waquet, "Qu'est-ce que c'est la République des lettres? Essai de sémantique historique', *Bibliothque de l'Ecole des Chartres* 147 (1989): 473–502; Hans Bots and Françoise Waquet, La République des lettres (Paris: Belin-De Boeck, 1997); Marc Fumaroli, *The Republic of Letters*, trans. Lara Vergnaud (New Haven/London: Yale University Press, 2018). See also the various essays in Hans Bots and Françoise Waquet, eds, *Commercium Litterarium. La communication dans La République des Letters. Forms of communication in the Republic of Letters 1600-1750*

proclaimed community of scholars which became highly popular across Europe over the course of more than three centuries. The Latin expression *respublica literaria* appeared for the first time at the beginning of the fifteenth century in Italy and is then notoriously recovered by Desiderius Erasmus (1466-1536) from about 1500 onward.[11] Since Erasmus was an exemplary letter-writer, new generations of scholars often used the expression 'Republic of Letters' and it has remained in use ever since, in Latin and in diverse vernaculars. The very expression of the Republic of Letters connoted mutual support, reciprocity, merit and the accumulation of knowledge, emphasizing its independence from the pressure of political structures, ecclesiastical interest and social hierarchies.

Letters were the medium of communication in the context of the Republic of Letters, or rather a precondition that held the pan-European community of scholars together. Dirk van Miert, for example, pointed out that "people became part of this community by the very act of writing letters: those scholars who failed or refused to establish sustained lines of communication, could not be reckoned as citizens of this Republic."[12] Anthony Grafton argued that "it is above all in the thousands of surviving letters that the outlines, highways and capitals of the Republic can be glimpsed most vividly" and Paul Dibon stated that "epistolary exchange was, in fact, the network that held this community together".[13] This emphasis upon the pivotal role of the letter poses unique challenges for visualizing it, something which was envisioned by Hans Bots already in 1971. He urged for "the availability of an electronic memory, including a research laboratory with sufficient financial means to optimize the use of seventeenth-century historical sources, such as correspondences, which would provide us with more accurate knowledge of the intellectual life in the XVII century".[14] Likewise, taking the case of the Gottfried Wilhelm von Leibniz (1646-1716), Maarten Ultee argued in 1987 that a social history of the Republic of Letters would explore the concrete details of memberships in this imagined community, including its geography, "the volume and frequency of letters as well as the social positions of its participants".[15] Specifically, Ultee urged for the need for "applying the techniques of social history to surviving correspondences", developing as such new ways to explore historical data.[16] Such an approach, he argued, would stress the limitations of his own abilities to convey what he had found in words in Leibniz's correspondence, concluding that "eventually a graphical representation will clarify the links in his network."[17] Ultee's research inspired the

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(Amsterdam/Maarssen: APA-Holland University Press, 1994). For more recent overview on the Republic of Letters, see Alexander Bevilacqua, *The Republic of Arabic Letters Islam and the European Enlightenment* (Cambridge: Harvard University Press, 2018); Carol Pal, *Republic of Women: Rethinking the Republic of Letters in the Seventeenth Century* (Cambridge: Cambridge University Press, 2012); Maria Berbara and Karl A. E. Enenkel, eds., *Portuguese Humanism and the Republic of Letters* (Leiden/Boston: Brill publishers, 2002).

[11] On Erasmus, see Lisa Jardine, *Erasmus, Man of Letters: The Construction of Charisma in Print* (Princeton/Oxford: Princeton University Press,1993); Constance M. Furey, *Erasmus, Contarini, and the Religious Republic of Letters* (Cambridge: Cambridge University Press, 2008); Hanan Yoran, *Between Utopia and Dystopia: Erasmus, Thomas More, and the Humanist Republic of Letters* (Lanham, Lexington Books, 2010).

[12] Dirk van Miert, 'What Was the Republic of Letters? A Brief Introduction to a Long History (1417–2008)', *Groniek* 204, no. 5 (2014): 270.

[13] Anthony Grafton, 'A Sketch Map of a Lost Continent: The Republic of Letters', *Republic of Letters: A Journal for the Study of Knowledge, Politics, and the Arts* 1 (2009): 9. Paul Dibon, 'Communication in the Respublica Literaria of the 17th Century', *Res Publica Litterarum. Studies in the Classical Tradition* 1 (1978): 50.

[14] Hans Bots, *Correspondance de Jacques Dupuy et de Nicolas Heinsius (1646-1656)* (the Hague: Springer, 1971), 237 (stelling VIII), "De beschikking over een elektronisch geheugen, waarbij tevens de aanwezigheid van een research-laboratorium met voldoende geldelijke middelen ver- ondersteld wordt, zou een optimaal gebruik van zeventiende-eeuwse historische bronnen, zoals correspondenties, bevorderen en zou ons tevens een nauwkeuriger kennis verschaffen van het intellectuele leven in de XVIIe eeuw."

[15] Maarten Ultee, 'The Republic of Letters: Learned Correspondence, 1580-1720', *The Seventeenth Century* 2, no. 1 (1987): 100.

[16] *Ibidem*, 100.

[17] *Ibidem,* 103.

subsequent work of a new generation of scholars in the late 1990s who increasingly brought the methods of cultural and social history to study the Republic of Letters in its social context.[18]

The more historians began to consider correspondence in relationship to the reconstruction of social networks, the more urgent the claims of Hans Bots and Maarten Ultee became.[19] In 1998, David S. Lux and Harold J. Cook observed that social network analysis can provide an alternative way of thinking about the circulation of knowledge during the scientific revolution.[20] They were inspired by the work of the well-known sociologist Mark Granovetter, who had studied the ways in which people sought employment. He concluded that job-seekers received information about job openings "from acquaintances rather than from those within their inner circle".[21] He termed this the "strength of weak ties".[22] Accordingly, Lux and Cook argued that weak ties were the reason why scholars in the Netherlands could do "excellent natural philosophy without having to be formally associated in a scientific society".[23] Then, in 2001, David Kronick pointed to the use of new techniques of digitizing and analyzing early modern correspondence. In particular, Kronick underlined how the use of citation analysis, a method used in the social sciences to cluster pairs of authors who cite the same paper in their bibliographies, can be used to describe relationship among individuals in early modern science. Such an analysis would reveal "more seventeenth- and eighteenth century invisible colleagues than those of which we are currently aware".[24] This "idea did not really bear fruit for the next decade".[25] In 2010, Yves Gingras reiterated Kronick's idea and developed a way to explore the role of citation and co-citations in the correspondence of Marin Mersenne (1588-1648), Henry Oldenburg (1615-1677) and Charles Darwin (1809-1882).[26] He took advantage of the digitization of Oldenburg's correspondence by the Electronic Enlightenment Project at Oxford University and JSTOR's searchable versions of the Philosophical Transactions to reconstruct their networks.[27] Gingras' idea of co-citation networks was integrated in the ePistolarium tool of the Huygens Institute of the History of the Netherlands in 2013.[28]

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[18] Edelstein et al., 'Historical Research in a Digital Age: Reflections from the Mapping the Republic of Letters Project. Historical Research in a Digital Age', cit. 411. For this new generation, see, for example, Anne Goldgar, *Impolite Learning: Conduct and Community in the Republic of Letters, 1680-1750* (Yale University Press, 1995); Dena Goodman, *The Republic of Letters: A Cultural History of the French Enlightenment* (Ihaca/London: Cornell University Press, 1996); Martin Mulsow, Die unanständige Gelehrtenrepublik. Wissen, Libertinage und Kommunikation in der Frühen Neuzeit (Stuttgart/Weimar: J.B. Metzler, 2007).

[19] This claim is made by Edelstein et al., 'Historical Research in a Digital Age: Reflections from the Mapping the Republic of Letters Project. Historical Research in a Digital Age', cit. 415.

[20] David S. Lux and Harold J. Cook, 'Closed Circles or Open Networks?: Communicating at a Distance during the Scientific Revolution', *History of Science* 36, no. 2 (1 June 1998): 179–211.

[21] Lux and Cook referred to the work of Granovetter, in 'Closed Circles or Open Networks?', 181.

[22] Mark S. Granovetter, 'The Strength of Weak Ties', *American Journal of Sociology* 78, no. 6 (1973): 1360–80.

[23] Lux and Cook, 'Closed Circles or Open Networks?', 202.

[24] David A. Kronick, 'The Commerce of Letters: Networks and "Invisible Colleges" in Seventeenth- and Eighteenth-Century Europe', *The Library Quarterly* 71, no. 1 (2001): 42.

[25] Edelstein et al., 'Historical Research in a Digital Age: Reflections from the Mapping the Republic of Letters Project. Historical Research in a Digital Age', cit. 415.

[26] Yves Gingras, 'Mapping the Structure of the Intellectual Field Using Citation and Co-Citation Analysis of Correspondences', *History of European Ideas* 36, no. 3 (2010): 330–39.

[27] Edelstein et al., 'Historical Research in a Digital Age: Reflections from the Mapping the Republic of Letters Project. Historical Research in a Digital Age', 416.

[28] 'ePistolarium', accessed 26 September 2013, http://ckcc.huygens.knaw.nl/epistolarium/. About ePistolarium, see W. Ravenek, C.M.J.M van den Heuvel and G.H. Gerritsen, *The ePistolarium: origins and techniques*, in *CLARIN in the Low Countries*, in *CLARIN in the Low Countries*, ed. Jan Odijk, & Arjan van Hessen (London: Ubiquity Press, 2017), 317-323. For the most recent discussion about the possibilities and limitations of the ePistolarium tool, see Charles van den Heuvel, 'Chapter III-4: Modelling texts and topics', in *Reassembling the Republic of Letters in the Digital Age. Standards, Systems, Scholarship*, ed. Howard Hotson-Thomas Wallnig (Göttingen: Göttingen University Press, forthcoming 2019).

In many respects, the early modern Republic of Letters can be used as an ideal testing ground for developing new ways of thinking about historical "big data".[29] As the number of historical letters shared online keeps growing it is time to take full advantage of this ever-extending dataset and to discover how computational approaches can advance the study and understanding of the Republic of Letters. Too much data – now as well in the past – as it turns out, might be a good thing.[30] Accordingly, in the past decade, early modern historiography has seen a proliferation of digital network projects that have started to map sections of the Republic of Letters. Within this relatively small field, the best-known projects – including *Six Degrees of Francis Bacon* of the Carnegie Mellon University, *Mapping the Republic of Letters* of Stanford University, *Circulation of Knowledge/ePistolarium* of the Huygens Institute for the History of the Netherlands in Amsterdam, *RECIRC* of the University of Galway, *Cultures of Knowledge* of Oxford University and *SKILLNET* of the University of Utrecht, all map relationships between early modern scholars. This study tries to contribute to this emerging field, highlighting the various gaps that exist in creating models to increase our understanding of the dynamics of early modern correspondence. Moreover, I attempt to concretize ways in which social network analysis can provide us with a better understanding of the structure and dynamics of epistolary networks in our case study of exchanges between the Dutch Republic and the Grand Duchy of Tuscany, which go beyond mere technical descriptions of centrality measures alone.

The Republic of Letters has often fallen prey to an over-socialized and static concept of networks, without examining how relationships become constituted and how they are negotiated over time. In other words, the temporal dimension of networks and the variability of their significance have not been handled well by network approaches to the Republic of Letters. Networks do not simply determine mobilization or career formation, but are a result of persuasive social interaction and a clear-cut strategy. The third chapter, therefore, focuses on the evolving dynamics of networking. In particular, we will take a look at how Tuscan and Dutch scholars build up their networks, as well as the strategies they adopted to secure their position therein. On the one hand, they needed to have access to innovative information and resources. This means that they needed to become involved with scholars from outside their own circle of trust, reaching out to others who could provide them with new information and recently published books. They needed to obtain a brokerage position in the network. On the other hand, the Tuscan and Dutch scholars needed to guarantee that their individual network was secure and trustworthy, the more so in view of the many transconfessional contrasts, which made it necessary to keep sensitive information secret and confidential. Hence, they needed to strategically negotiate between openness and closure in their network, a struggle that continued throughout their entire epistolary career.

In order to analyze these dynamics, the fourth chapter uses mathematical and computational techniques developed by social network scientists to reconstruct and analyze the social organization of the relations between the Grand Duchy of Tuscany and the Dutch Republic. Specifically, by data-mining two heterogeneous, but complementary datasets, a unified, systematized network representation has been created to better understand the way scholars between these two societies were connected. This network has been further enriched with archival transcriptions of letters extent in library collections of the Netherlands, Germany and Italy, as well as with early printed correspondences. The result is a dataset that comprises metadata of circa 10.000 correspondences that forms the backbone of this research. On the basis of this network of the social relations between the Grand Duchy of Tuscany and the Dutch Republic, in this chapter, patterns based on a set of principles will be discussed to capture some subtle

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[29] Edelstein et al., 'Historical Research in a Digital Age: Reflections from the Mapping the Republic of Letters Project. Historical Research in a Digital Age', 414.
[30] I refer here to the study of Ann Blair, *Too Much to Know. Managing Scholarly Information before the Modern Age* (New Haven/London: Yale University Press, 2010).

distinction in how one's network position benefits or disadvantages those people who occupy them. The distant reading of these patterns, which will be introduced in more detail in the next paragraph, will be combined with a close reading of the correspondence to underpin the evolving dynamics of the early modern epistolary network.

The Republic of Letters is often described in very idealistic terms. Hans Bots called it a 'supranational European community of scholars', Franz Mauelshagen referred to it as "a fictitious community-without a territory" and Anthony Grafton as "Europe's first egalitarian society". [31] Yet, traditional literature has taught us that the harmony of the ideal of the Republic of Letters was rarely achieved in reality. Within the dynamics of cross-cultural exchanges between the Dutch Republic and the Grand Duchy of Tuscany, scholars had to deal with the many tensions and conflicts arising from the opposing political and religious realities. In addition, jealousy and competition dictated the choices scholars had to make in the formation of their network. To reason about how fissures in an epistolary network may arise from the dynamics of conflicts, disagreement and antagonism between corresponding scholars, in the fifth chapter we will focus on a theory that never has been considered before in analyzing early modern correspondence networks: the structural balance theory. The principles underlying structural balance are based on theories in social psychology dating back to the work of Heider in the 1940s.[32] Structural balance offers to capture both positive and negative links to understand the tensions between people within the network. In addition, it assumes that people constantly evaluate the quality of their relationships in order to achieve a balanced position in a network. With the application of this method from the social sciences, I intend to fill the gap between digital and traditional research methods of the humanities used in the analysis of the Republic of Letters so far. In most approaches that map the Republic of Letters digitally, the connections have a rather positive meaning. Such representations reinforce the rather naive idea that the Republic of Letters was an ideal community of peaceful co-existence between intellectuals. Therefore, the fifth chapter will argue that the digital representation of the early modern scholarly network should also account for the negative and hostile relations in the network.

In the Republic of Letters knowledge was not just transferred by letters. Building on the actor-network theory of Bruno Latour, I argue that agentic objects or nonhuman actors, like books, deepen our understanding of the early modern epistolary network.[33] Most studies employ one-modal networks where one node of the graph represents a correspondent and an edge between a pair of nodes corresponds to a letter exchanged between them. Yet, reducing the early modern society to a network in which the actors are connected by one single type suggests a static uniformity that does not take into account the multi-faced dynamics of epistolary exchange. In addition to letters, the early modern network was tied, and untied, together primarily by means of books. Books always have been powerful and could foster ties when given as gifts, as well as influence and endanger the network if unwanted or provoked by others. Therefore, this final chapter intends to discuss un approach that integrates both letters and books in a unified and dynamic multimodal network representation.

Important in this respect is the study of Héloïse Hermant, who has used the notion 'dispositif' to describe early modern communication "as a plan or mechanism with many individual parts developed in

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[31] See Charles van den Heuvel et al., 'Circles of Confidence in Correspondence. Modeling Confidentiality and Secrecy in Knowledge Exchange Networks of Letters and Drawings in the Early Modern Period', cit. 80. Examples of these idealizations can be, according to Van den Heuvel, found in the work of Grafton, 'A Sketch Map of a Lost Continent: the Republic of Letters; Franz Mauelshagen, 'Networks of Trust: Scholarly Correspondence and Scientific Exchange in Early Modern Europe', *The Medieval History Journal* 6, no. 1 (2003); Hans Bots, 'Introduction', in Christiane Berkvens-Stevelinck and Hans Bots, eds., *Les grands intermédiaires culturels de la République des Lettres* (Paris: Honoré Champion Editeur, 2005).
[32] See David Easley and Jon Kleinberg, *Networks, Crowds, and Markets: Reasoning About a Highly Connected World* (Cambridge: Cambridge University Press, 2010), cit. 108.
[33] Bruno Latour, *We Have Never Been Modern*, trans. Catherine Porter (Cambridge: Harvard University Press, 1993).

order to overcome an obstacle or to achieve a goal".[34] Building on this definition, multimodal networks can be seen as the equivalent of 'dispositifs', in the sense that they both consist of multiple entities that characterized the dynamic nature of communication. Whether the goal is to circumvent control, or to overcome confessional barriers, multiple layers of data may provide a broader picture of the networks and strategies in question.

2. THE IMPORTANCE OF DISCLOSE READING

The digital turn of the last decades affords the unique opportunity to chart the cross-cultural exchange between the Dutch Republic and the Grand Duchy of Tuscany. This study looks at the potential of databases to generate histories. As the number of historical letters shared online keeps growing it is time to take full advantage of this ever-extending dataset that can be used in more sophisticated ways than just making use of them as an ordinary catalogue to query for results. In fact, they offer the prospect of applying computational visualizations and analyses that enables us to handle a large amount of data that traditional research fails to do. This is what in the digital humanities is being called "distant reading", a term coined by Franco Moretti, as opposed to close reading, where one takes a step back and looks at the archive as a whole to spot overarching trends or developments that have been overlooked perhaps by traditional scholarship.[35] Distant reading, however, results in a loss of contextual and textual information that a close reading, so the in-depth reading of the historical source, can reveal.

An understanding of the patterns of cross-cultural exchanges can be improved by thinking in new terms of collectivity rather than in individuality, in structures rather than in biographies. On the other hand, numerous statements of, for example, confidentiality and secrecy, are impossible to check without the close reading of many letters. Therefore, the hybrid nature of epistolary networks will require a multidisciplinary approach combining book historical research with hermeneutics and digital humanities methods based on pattern recognition. In other words, the value of this research lies in the combination of methods for network analysis for distant reading of large sets of letters with close reading devoted to achieving a deep understanding of the source. These two methods are in continuous interaction with each other. This means that distant reading will uncover how social relations are represented and constructed, sometimes reinforced and sometimes even transformed and dissolved, which is enriched by close reading to focus on specific features that have influenced those dynamics. Vice-versa, one could identify several interesting angles for in-depth research and comparison of processes occurring in societal developments directed by a richer version of the properties of a network.

Both methods have their strengths and weaknesses; with close reading one often tries to hypothesize overarching theories from a very limited sample of letters while with distant reading one may identify overlapping patterns in a larger set of letters, but it often results in a loss of the contextual information that a close reading can reveal. Ideally, historical research should switch smoothly between distant and close reading that are complementary, rather than contradictory:

> "The important next step is combining the distant and the close reading, mixing traditional
> historical research with the newer quantitative studies. The combination holds the promise of

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[34] Héloïse Hermant, 'Les Dispositifs de Communication de Don Juan José et l'orchestration d'un Mouvement d'opinion', in *La Communication En Europe de l'âge Classique Au Siècle Des Lumières*, ed. Pierre-Yves Beaurepaire (Paris: Belin, 2014), 162–94.

[35] Franco Moretti, *Close Reading* (London/New York: Verso, 2013). Matthew L. Jockers refers to this same approach as "macroanalysis", see *Macroanalysis: Digital Methods and Literary History* (Urbana: University Of Illinois Press, 2013).

a new historical synthesis, a longue durée history more firmly grounded in the sea of as-yet-disconnected micro- and meso-histories we often find ourselves trudging through".[36]

Thus, both readings should interact to strengthen historical interpretations. I would like to call this combination "disclose reading" whose implementation will become central throughout this study.

Distant reading does certainly not do our work faster for us, but rather points to where our work lies as well as giving depth to our research field. In this respect, the pioneering research of a Roman Catholic priest come to mind. In 1941, Father Roberto Busa (1913-2011) initiated his PhD in Thomistic philosophy at the Pontifical Gregorian University of Rome, focusing on the concept of 'presence' in the works of the thirteenth-century philosopher and theologian Thomas Aquinas (1225-1274).[37] When searching through indexes for the words of *praesens* and *praesentia*, Busa soon noticed that Aquinas linked such words with the preposition *in*. Consequently, he began to manually compile an index of all the concordances of the preposition *in* in the works of Aquinas. Busa wrote out by hand 10.000 cards, each containing a sentence with the preposition *in* or a word connected with *in*. "Grand games of solitaire followed", to use the Busa's words.[38] Busa's dissertation, which he defended in 1946, was thus founded on a complete, handmade concordance – consisting of 10.000 hand written cards. Nevertheless, it consisted of only one entry: *in*. The next challenge for Busa was an index of the lemmatization of all words in the complete works of Aquinas, containing all inflected forms of a given word in order to analyze them as single items. This *Index Thomisticus* was needed to get not only insight into Aquinas's own conceptual system but, above all, to help other scholars for analogous studies. For this enterprise, he was in need of "some type of machinery" that could process texts containing more than million words.[39] This brought him, in 1949, to the Unites States, specifically to the International Business Machines Corporations (IBM) in New York, whose director at the time, Thomas J. Watson Sr. (1874-1956) agreed to help him in this project. In the United States, the IBM had become leader in the mechanical manipulation of punch cards – also called IBM cards.[40] Busa gradually transferred the entire texts of Saint Thomas Aquinas to these mechanical punch cards to generate the concordance.[41] 30 years later, this resulted in the *Index Thomisticus*, a complete lemmatization of the works of Aquinas automatically composed and printed by punched card machines. The Index is divided in 56-volumes and was published from 1974 until 1980, representing nowadays the landmark of the Digital Humanities.[42] The case of Father Busa shows how the use of data-processing tools can enrich literature and scholarly studies. In fact, according to Busa, researcher should not use the computer primarily for speeding up processes or minimizing the work:

> "To repeat: the use of computers in the humanities has as its principal aim the enhancement of the quality, depth and extension of research and not merely the lessening of human effort and time. In fact, the computer has even improved the quality of methods in philological

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[36] Scott Weingart, 'The Networked Structure of Scientific Growth', The Scottbot Irregular, accessed 22 February 2012, http://www.scottbot.net/HIAL/index.html@p=12050.html, 29.

[37] Steven E. Jones, *Roberto Busa, S. J., and the Emergence of Humanities Computing: The Priest and the Punched Cards* (Routledge, 2016), 1. Other studies regarding the extraordinary accomplishments of Busa: Julianne Nyhan and Andrew Flinn, *Computation and the Humanities. Towards an Oral History of Digital Humanities* (Cham: Springer, 2016), 1-3; Corrado Bonfanti, 'Roberto Busa (1913-2011), Pioneer of Computers for the Humanities', in *Reflections on the History of Computing : Preserving Memories and Sharing Stories*, ed. Arthur Tatnall (Heidelberg: Springer, 2012), 57-61.

[38] Roberto Busa, 'The Annals of Humanities Computing: The Index Thomisticus', *Computers and the Humanities* 14 (1980): 83

[39] *Ibidem,* 83.

[40] Thomas Nelson Winter, 'Roberto Busa, S.J., and the Invention of the Machine-Generated Concordance', *The Classical Bulletin* 75, no. 1 (1999): 7.

[41] Winter, 'Roberto Busa, S.J., and the Invention of the Machine-Generated Concordance', 8.

[42] Busa, 86–87.

analysis, because its brute physical rigidity demands full accuracy, full completeness, full systematicity. Using computers, I had to realize that our previous knowledge of human language was too often incomplete and anyway not sufficient for a computer program. Using computers will therefore lead us to a more profound and systematic knowledge of human expression; in principle, it can help us to be more humanistic than before."[43]

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[43] Busa, 89.