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Citation: Fincham, Andrew and Burton, Nicholas (2021) Religion and social network analysis: the discipline of early modern quakers. *Journal of Management History*, 27 (3). pp. 339-358. ISSN 1751-1348

Published by: Emerald

URL: <https://doi.org/10.1108/JMH-02-2020-0011> <<https://doi.org/10.1108/JMH-02-2020-0011>>

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INTRODUCTION

For the past few decades, the role and structure of networks has continued to interest management and organization historians who seek to advance and elaborate an understanding of their characteristics. For example, journals of management, organizational and economic history have examined networks from a number of different contexts, through time and space, including industries such as energy (Madureira, 2007; Schisani and Caiazzo, 2016), maritime (Boyce, 2003; Munro and Slaven 2001), railways (Divall, 2006), and the banking and finance sectors (eg, Bennett, 2013; Buchnea, Tilba, and Wilson, 2018; Wilson, Buchnea and Tilba, 2017; Sotiropoulos, Rutterford, and van Lieshout, 2019), as well as across different geographies (Cookson, 1997; Crumplin, 2007; McDade, 2011; Forestier, 2010).

Networks are often conceived as a relational structure that sit between organizations and industries and which can influence transaction costs, provide opportunities to share and disseminate market information, and provide access to social contacts and different forms of capital (Popp, Toms and Wilson, 2006, Hoang and Antoncic, 2003). Network analysis, therefore, has the potential to shed light on the inter-relationships between different entities, and how these develop across time and space. The structure of networks – the focus in this paper - is often based on high-levels of trust between individuals based upon kinship (Lopez-Morell and O’Kean, 2008) or quasi-kinship relations such as religion (Crumplin, 2007) and other forms of social relations which encourage close-knit communities. Yet, despite a far-reaching and cross-disciplinary scholarship on how family and kin affect network relations, the way in which shared normative commitments – such as religious commitments - have shaped the formation and development of networks remains surprisingly under-elaborated, despite a few notable exceptions (Bell, 2006; Bergquist and Eriksson, 2019; Dent and Bozeman, 2014; Karaçuka, 2018; Raskov and Kufenko, 2017; Wirtz, 2017). This is rather surprising. Co-membership of the same religion is not only perceived to generate a sense of belonging among co-religionists but it often features a commitment to shared moral

obligations based upon prosocial commitments trust, integrity and reciprocity (eg, Forestier, 2010; Richman, 2006) fostering the development of high-levels of religious social capital (eg, Baker and Miles-Watson, 2008; 2010; Bourdieu, 1991).

One of the key debates in the literature in which we locate our paper relates to whether religious social networks follow a pattern of development through 'iterative business activity', with the associations between individuals and/or firms strengthened and extended by repeated engagement in exchanges of one form or another, or in contrast whether such religious social networks derive efficacy from an 'attributes-based' character (eg, Granovetter, 1973; 1992; Wilson and Popp, 2003). Therefore, we seek to advance a deeper understanding of how the attributes of a religious group might impact upon network formation and development. This interest motivated us to approach a study of the Religious Society of Friends (Quakers) (hereinafter 'Quakers') in the long eighteenth century that addresses the relationship between membership of the Quakers and network topography. We were particularly interested in uncovering the relationship between the theology and wider normative commitments of a religious group – the Quakers - and network formation and development. We hope that by doing so we are able to provide (counter) evidence for the claim that Quakers were one of the pioneers of responsible business (Burton and Turnbull, 2019).

We chose to examine Quakers as they are known to have played a central role in the development of a variety of industries in the eighteenth and nineteenth centuries, with perhaps the best-known nineteenth century example being confectionary (e.g. Burton, 2019; Emden 1940, King 2014, Raistrick 1950, Windsor 1980, Walvin 1997), however their importance and reach originates at least a century earlier (Raistrick, 1950) despite this period often being ignored in Quaker scholarship. Although the ethics of Quakers businesses has attracted a few critical voices (e.g. Rowlinson 1988, 1995; 1998; Rowlinson and Hassard 1993; Sahle 2015, 2018; Smith, 1967), Quakers are nonetheless traditionally associated with attributes of honesty and integrity, drawing upon religious principles and ethics (Fincham 2017). Quakers

were known for their hard work (King 2014) which was successfully leveraged through strong bonds of both kinship and religion (Burton and Turnbull 2019, Fincham, 2019; Sahle 2018). While Quakerism has played a pivotal role in business history, and have made a distinctive contribution to that history, it has received relatively little attention in the management and organization history literature, although studies of nineteenth century Quaker firms by Burton, et al., (2019), Maclean, et al., (2020), Robertson, et al., (2007), and work on Cadbury by Rowlinson (1988; 1995; 1998) and Dellheim (1987) are notable exceptions. However, despite these contributions, we continue to know very little about Quakers and their involvement in commerce in the long eighteenth century, nor the way in which the Quaker network served as a basis for commercial organizing and coordination.

To signpost our contribution, this paper advances the idea that inter-relations in the Quaker network did not primarily develop through repeated iteration. Rather, we find that the Quaker network topology had a number of distinctive features which arose directly from the Quaker rules which was known as the ‘Discipline’. Membership required adherence to both the Society’s theology and the normative commitments arising from this ‘Discipline’, which in turn acted as a proxy for trust and integrity that circumvented the need for iterative engagement to build trust. The Discipline thus acted as a quasi-regulatory mechanism to govern member behaviour to ensure compliance with the moral expectations of the Society. Thus, through acceptance and adherence to the ‘Discipline’, individuals were granted membership of the Society and granted access to the wider benefits of membership – not least access to an international network. Access to the Quaker network, which was open to all members, boomed in the early part of the long eighteenth century, rising from a few dozen at the end of the interregnum to a peak of perhaps 45,000 (Fincham, 2019). Quaker Discipline required members to behave in a manner that brought no reputational risk to the Society, and those who did risked exclusion in the form of public disownment. A member wishing to relocate anywhere across the network (including internationally, as thousands did during the early colonial period) was obliged to obtain ‘certification’ in the form of a paper of approval,

signed by multiple members of their local community, which attested to their financial independence. This ensured that membership could be taken as a proxy for trust, thus acting as a substitute for iteration which created a permeable network, with a unique topology which supported successful commerce across the trans-Atlantic world.

Our paper is set out as follows: first, we review the literature on social networks and religion in the context of the management and organizational history literature. Next, we introduce the Quakers and the role of Discipline. We follow this with an explanation of our methods, and proceed to describe our findings. We conclude with an extended discussion and provide some concluding remarks and pathways for future research.

NETWORKS, RELIGION AND QUAKERS

Despite the formalization of many networks in the last 200 years (Bennett, 2013), in the long eighteenth century (and thus before the general availability of incorporation) informal and social networks were critical to many businesses by reducing transaction costs, providing access to capital, and offering opportunities to gain intelligence and information. In the long eighteenth century the majority of enterprises displayed characteristics that were similar to those of the entrepreneur (O'Donnell, Gilmore, Cummins, and Carson, 2001). Pollard's (1968) pioneering attempt to provide a management history of the industrial revolution illustrates the types of business enterprises which were arising in the long eighteenth century: in terms of numbers, the fewest were landed estates, the majority were the domestic system, while specialisms were arising with the subcontracting or contracting out system. These latter, he concludes, helped form managerial practices which evolved into those persisting in large-scale industrial enterprises. Pollard provides a chapter on the development of enterprises from 1760 to 1830, the first half of which covers the end of our period of study, and shows how metallurgy, mining, shipping, pottery and textiles developed from family concerns into more modern business enterprises, run by owner-managers who had an

education which would include book keeping, but which was grounded in the practical, with the apprentice system still important and religion as powerful an influence as profit.

Popps, Toms and Wilson (2006) emphasized how networks provided relational governance that constrained managerial opportunism, but also encouraged coordination, a point previously asserted by Toms and Filatotchev (2004). However, the benefits of networks extended beyond decreased transaction costs, and in later work Williamson (1985), for example, suggested that the relational and social interdependence which underpin networks provided efficiency benefits, and a 'communicative rationality' based upon learning processes upon which social relationships are founded (Boyce, 2003). Belonging to a network conferred social benefits and often signalled respectability and trustworthiness (Forestier, 2010). For instance, Pearson and Richardson (2001) examined business networking in early Industrial Britain and found evidence that efficiency gains from lowered transaction costs arose where resources were shared by those with social associations outside commerce and highlighted the importance of trust and relational closeness.

Networks were therefore often based on high-levels of trust between individuals. These often stemmed from kinship relations (Lopez-Morell and O'Kean, 2008), with an objective of preserving the family's reputation, or quasi-kinship relations with bonds of religion or social and leisure associations substituting for kinship ties (Crumplin, 2007) and which were reinforced via the iterative development of trust, reciprocity and mutuality to foster a relational closeness similar to the idea of an extended family (Cookson, 1997; Mathias, 2002). Attributes such as honesty and shared morals were therefore seen as essential to address the needs of early networks (Raskov and Kufenko, 2017). Social networks bounded by religion also enabled individuals to generate social and religious capital and rely upon non-formal contract enforcement mechanisms (Karaçuka, 2018). Crumplin (2007), for example, noted how internal controls were used to govern member business conduct, and the threat of

exclusion acted as a strong deterrent against acting in a manner that contravened established moral norms.

Quakers have long been associated with the world of commerce, and a number of oft-cited works have attested to the importance of the Quaker network in explaining their commercial success despite small numbers in membership (eg, Child, 1964; Raistrick, 1950; Walvin, 1997; Windsor, 1980). From the late seventeenth to the nineteenth century, Quakers were highly active creators and early adopters of economic activities involving industrial capitalism (Raistrick 1950; King 2014). Quaker firms came to dominate the fields of iron and chocolate (Raistrick 1950, Cadbury 2010), helped develop pharmaceuticals and railways (Walvin 1997), while profits from these enterprises fuelled lending which created the banking houses of the Gurneys, Peases, Lloyds and Barclays (Vann, 1969). While not all Quakers were engaged in commerce, and not all succeeded, a disproportionate number did (Fincham 2018); such success is all the more intriguing since the Religious Society of Friends were a tiny (and from the mid-eighteenth century declining) minority of the UK population (Wrigley et al., 1989).

Historians traditionally account for Quaker commercial success in terms of a unique set of Quaker principles: '...probably the most important [factors] are the high qualities of mind and spirit that were characteristic of many Friends [Quakers]' (Raistrick, 1950, p42). However, the effectiveness of such ethics was acknowledged to be enhanced by strong bonds of kinship which created connections resembling that of an extended family in terms both of reach and closeness (Raistrick, 1950). While Raistrick avoided the use of the term 'networks', a tripartite network model of religion, kinship, and mercantile networks was suggested by Winchester (1991). Subsequent work has emphasized additional connections within the Quaker organisation, including education, apprenticeship, social and finance, all of which enabled members to take advantage of appropriate opportunities across the Religious

Society of Friends nationally and internationally (Burton and Turnbull 2019, Sahle, 2018, Fincham, 2017).

While customers came from the wider community, Quakers tended to deal with fellow Quakers when looking for producers, middlemen, or distributors (Sleapwood, 2017); across the oceans, Quakers who traded with each other often invested together, sharing risk (Tolles 1948, Price 1986). Detailed observations by Raistrick (1950) show network synergies in textile production, as well as supply chain advantages whereby Bristol's Quaker brass makers used Cornish Quaker tin, and Quaker coal from Wales powered the engines to mine and refine Quaker silver and lead. Large numbers of fellow Quakers were employed by concerns such as those of Sharp, Gurney, or Derby (Grubb, 1930). Both Walvin (1997) and Turnbull (2014) highlights the role of the Quaker network in providing access to capital to underpin many infrastructure projects, while connections could even increase solvency, as a Dublin shipbroker found when offloading coal in a hurry – even if at a loss - to Quakers as buyers (Grubb, 1930).

As we shall highlight, of key importance to this paper is what was known as the Quaker Discipline; this was formed around a central selection of advices collated by Quakers since their inception in the mid-seventeenth century, and which the membership were expected to abide by; published as 'Extracts from the Minutes and Advices of the Yearly Meeting of Friends' (1783), the Religious Society of Friends administered adherence to these norms at meetings for Discipline, where issues of errant behaviour were raised, and members selected to visit the 'disorderly' individual, with a view to achieving repentance and restoration (Extracts, p43). The headings under which the advices were grouped give a valuable indication of their wide application and include: Appeals (against societal decisions); Arbitration (in case of inter-member dispute); Discipline (and the conduct of meetings); Marriage (only within the Society of Friends); Trade (good conduct of, including risk and debt); Wills, Executors and Administrators (appointments and recordkeeping). Other sections addressed Quaker beliefs on non-participation in war and the militia, non-payment of tithes,

no oath taking (and the use of affirmation), plainness, liberality to the poor, education and apprenticeships, and dozens of others from gaming to mourning.

METHOD

We conceptualize a Quaker network through an individual's membership of the Religious Society of Friends. This approach allows us to locate Quaker individuals as nodes of the network, as well as acting as an attribute of connection. Quakers developed connections across the trans-Atlantic world from the late seventeenth century, when many migrated to follow opportunities in the newly-formed Pennsylvania and other colonies, and continued until at least the Revolutionary war of 1776 (Goldstone 1998, Landes, 2015).

In order to identify and assess aspects of the topography of the Quaker network we used an approach based on Social Network Analysis (SNA). SNA originated in the early twentieth century out of aspects of social psychology, developing through sociometry during the first half of the century until re-structured in the last quarter around a mathematical-metrical core (Freeman, 2004). A comprehensive coverage of the methodology and applications of the field was produced by Wasserman and Faust (1994), and while the field is now largely dominated by automated, algorithmic approaches (following Borgatti et al, 2002), SNA has been widely used in multiple disciplines. Networks are composed of ties (edges) linking members (nodes). In a network, many different types (attributes) of edges may be identified – such as friendship, education, profession, or kinship; similarly, nodes may be considered as individuals, or as entities – such as stakeholders, cities, corporations or states.

In this paper, we deploy SNA to help identify the degree of commonality of attributes of edges across a range of nodes selected from the Quaker network during the period 1675-1800. Collating such data on the prevalence of attributes allows conclusions to be drawn regarding the general network structure, not least its levels of cohesion (a function of the density of connections) and the topology or shape (based on the distribution of ties between nodes) (Borgatti, Everett, and Johnson, 2013). Key characteristics are centrality (the extent to

which edges are focused on smaller number of key individuals, rather than spread over all nodes in a network), or a core-periphery topology, where some nodes are dense, while others are loosely-connected (Freeman, 1978); and density, which indicates the coherence of the network as a whole, based on how many different paths can be traced between the same nodes, compared with the potential number of ties in a network (Faust, 2006). Finally, geodesic indicators assess the distances (number of edges) in paths between nodes, and give some indication of the effectiveness of transmission flow: short paths are indicative of more efficient transmission or flow within a network (Borgatti, Everett, and Johnson, 2013). These metrics are related: thus, the higher the density, the higher the potential for shorter connections between non-adjacent nodes, which results in a reduction in the geodesic towards the lower end of the possible range, as dense nodes will tend to be widely connected (Borgatti, Everett, and Johnson, 2013). Finally, the structural cohesion may be assessed, which considers the proportion of nodes that would need to be removed for the network to cease.

In terms of indicators, we follow the review of network literature by Hoang and Antoncic (2003) which identifies three key constructs: content (the transmission of various resources through the network, such as information, investment, opportunity, or problem solving); governance mechanisms (which support exchange, such as trust); and structure (the pattern of relationships arising from direct and indirect ties between actors).

The data set required all nodes to be members of the Religious Society of Friends, and active in commerce during the period. We utilised a catalogue of Quaker publications prepared by Kuenning, the editor of Quaker Heritage Press (QHP). “The Catalogue of Quaker Writings” (Quaker Heritage Press, 2007) lists writings from the seventeenth, eighteenth and nineteenth centuries and consists of several thousand volumes. This was searched for biographical publications, looking for titles which included key words such as “Life”, “Journal”, or “Memoir”, which produced a data set consisting of 93 potential

publications. From this data sub-set, we selected individuals born before 1754, to enable them to be of age in 1775. This further isolated 27 texts which were then explored to assess if the individual was engaged in trade using the following key search terms: “trade”; “trading”; “trader”; “loan”; “debt”; “commerce”; “commercial”; “sale”; “deal”; “bought”; “sold”. This resulted in 13 memoirs/journals of Quakers in the early modern period engaged in some form of commercial activity. Based upon our systematic review, we decided to analyse the memoirs/journals of these 13 individuals. The individuals identified were: John Banks (1637-1710); Samuel Bownas (1676-1753); Thomas Chalkley (1675-1741); William Cookworthy (1705-1780); William Crouch (1628–1710); Richard Davies (1635-1708); William Edmundson (1627-1712); David Ferris (1707-1779); John Kelsall (1683-1743); Samuel Neale (1729-1792); William Rotch (1759-1850); Thomas Story (1670-1742); and William Stout (1655-1752).

We also analysed thematically the most influential work on the period 1675-1775 dealing with commerce: Arthur Raistrick’s “Quakers in Science and Industry” (1950) which describes the connections between early modern Quakers engaged in commerce. By re-examining Raistrick’s work, we produced a taxonomy of “codes” - distinct network attributes which together allowed for an assessment of ways in which each member of the Religious Society of Friends might be potentially linked to another – either directly, or via a path of edges through the network. Our review of Raistrick’s work suggested a total of nine Attribute types, as shown in Table I.

<<<Insert Table 1 here>>>

Having created a taxonomy of *a priori* Attributes, the sample data derived from “The Catalogue of Quaker Writings” (Quaker Heritage Press, 2007) was examined to establish the presence or absence of the attribute profile for each individual (node) in the early modern commercial Quaker network. Each text was then reviewed in search of evidence for each of the attributes in the attribute set, and we identified any textual data that related to our codes

(eg, attributes). We remained open to new codes (attributes) emerging from the data, and were similarly open to deleting or adjusting our a priori codes (attributes). However, we found in our coding process that was not necessary. By ascribing textual data to the codes (attributes), we were able to then record the total for each subject and each attribute.

FINDINGS

The findings are arranged in two sub-sections. The first concerns the creation of the attribute taxonomy, and the second examines the attribute distribution.

Attribute Taxonomy

Membership attribute

This was not a formalised process in terms of either a membership register or process until the early eighteenth century. Quakers were expected to identify themselves by the use of the Society's formal Certification mechanism whereby an individual outside the areas where they were known would take a formal paper signed by multiple local Quakers in order to prove they were a member in good standing, both economically and in terms of conduct.

Commercial attribute

Quaker traders were known for engaging with fellow Quakers both up and down the supply chain, who would supply goods on credit, or act as distributors, or agents when travelling. Quakers regularly co-invested to share risk, not least with international ventures usually involving cargoes to the colonies, or imports from continental Europe (Price, 1996)

Marriage attribute

The practice of endogamy began early and was subsequently enforced through the Discipline which forbade Quakers marrying outside the sect. A Quaker marrying an outsider, or even two Quakers being married by a priest (this frequently occasioned until the Society's

marriages were recognised in 1755) were expected to demonstrate contrition else risk expulsion.¹

Minister attribute

Certain Quakers were acknowledged and registered as ministers, who were entitled to represent the Society outside their own districts, and would often travel in pursuit of spreading the Quaker message, sometimes at the expense of their meeting.

Travel attribute

The Society was enthusiastic in promoting exemplary 'Journals' of those members who combined trading with service in the 'ministry'. Many of those ministering were also recorded as doing business and ministry and trade was far from unusual before the end of the eighteenth century. (Penny, 1913).

Kinship attribute

Distinct from marriage, Quakers were increasingly drawn from families with Quaker connections. These relationships exemplified the reality of the cognomen 'Quaker cousins', and religious allegiance was commonly transmitted through kinship networks (Spufford, 1974). Over time this ensured that succeeding generations were inevitably linked if remotely, even if they themselves did not marry, and the relationship between kinship and business was often evident (Raistrick 1960).

Financial attribute

Both lending and co-investing were common practice within the Society from its inception (Walvin 1997): while most engaged in sole trader type activity, businesses might be financially supported by fellow Quakers via bridging loans to purchase raw materials, or capital equipment. Such loans would later form the basis of the Quaker merchant banking

¹ Raistrick established the commercial importance of inter-marriage; indeed, he notes that it was the 'frequent occurrence of Quaker names' encountered while writing a history of technology that stimulated his research (Raistrick, 1950, intro).

houses - not least that of the Gurneys, Peases, Lloyds, and Barclays (Raistrick, 1950). Notwithstanding, many more numerous transactions arose as the result of Quakers' collections and disbursements as part of the Monthly Meetings, managing gifts and legacies.

Office-holding attribute

The Quaker organisation required members to take certain roles, which originated early in the Society of Friends' development, and continued throughout the period. Principal amongst these were the role of clerk, recording decisions, Elder, supervising Discipline, and Overseers, looking after welfare. Other offices included representation at other meetings, including national events such as the yearly meeting. Quakers could also stand as Trustees, Guardians for minors, and Executors of Quaker wills, which often included bequests or legacies.

State attribute

The final set attributes concerns Quakers representing the corporate body in various dealings with various official or governmental bodies. Quakers had lobbied since before the Toleration Act of 1689, when the personal intervention of powerful Quakers (George Fox with Oliver Cromwell, and William Penn and the future James II) help relieve the pressure of enforced religious conformity. The London administration set up their Meeting for Sufferings in 1675 to lobby parliament. Later interactions occurred in respect to patents – which were obtained by several Quaker manufacturers - and established other areas of cooperation – as with the renewal of the Affirmation Acts (to obviate oath taking) in the first quarter of the eighteenth century.

Attribute Distribution

A review of each the thirteen selected individuals finds that all the individuals had multiple connections within the Quaker community, and the individual (node) findings are represented in Table 2 below, where '1' represents an edge with the attribute, while '0' indicates that the attribute was not present - or that the text and associated records are unclear.

<<<Insert Table 2 here>>>

John Banks (1637-1710)

Banks became a Quaker in Cumberland in 1654; noted for his literacy, and ability to read Latin; he was apprenticed as a fellmonger and glover; he was a minister in England and Ireland (which continued even when imprisoned - his powerful voice being audible in the street outside Carlisle Gaol). In 1696 he married Quaker Hannah Champion, and set up as a grocer. He was noted as an Overseer – an officer of the Society concerned with Discipline at Glaston and Street meetings in Somerset; and was also called upon to act as an arbitrator in intra-Society disputes at Glastonbury. (6 attributes)

Samuel Bownas (1676-1753)

Bownas was apprenticed under financially straightened circumstances first to his uncle as a blacksmith, and later Quaker Samuel Parat of Briggflatts Meeting, where Bownas became a member. He then travelled widely across England as a minister before leaving for America; he provides an account of meeting with an ‘Indian King’ and his representatives while there. A Quaker widower, his second marriage provided finance to set up in business, and he became a prosperous merchant, which facilitated his role as a Quaker chronicler in print. (7 attributes)

Thomas Chalkley (1675–1741)

The child of Quaker parents, Thomas attended a Quaker school, followed by a formal apprenticeship to his father as a trader in meal. As a young man he undertook travelling ministry tours to the west of England and Scotland, and in 1697 made his first visit to America, and subsequently ministered widely in the Caribbean, and to Native Americans. He travelled in Ireland, the Netherlands, and Germany, as both minister and a representative of English Quakers. A ship master, he dealt with other Quaker’s cargoes commercially, and he sometimes traded himself. Chalkley married a fellow Quaker, and attended London Yearly Meeting. (8 attributes)

William Cookworthy (1705–1780)

Born to Quaker parents, and apprenticed to Quaker apothecaries (the Bevans of Plough Court, London), he was taken into partnership, and later set up his own business in Plymouth (1726). Married into a Quaker family, he was also a noted minister, travelling until ill-health prevented. His scientific experimentation in many fields (not least porcelain) and led him to create business ventures with fellow Quakers, and involved several other investors, and governmental patent applications, including one for porcelain (with Lord Camelford in 1768). (9 attributes)

William Crouch (1628–1711)

Apprenticed in London, Crouch set up as an upholster at Exchange Spread Eagle-Court in Finch-Lane, near Cornhill. One of the first generation, he followed both his mother and sisters in becoming a Quaker, and later married another convinced Quaker (Ruth Brown). He was a founder member of the important administrative meeting for London Quakers (known as the Six Weeks' meeting), and was also a member of the key Disciplinary Meeting (Two Weeks' meeting) from around 1656. He was appointed by London Yearly Meeting to be the supervisor of printing and distribution of Quaker books (in 1672), and became one of the record holders, collating selected English and foreign 'sufferings' (1676). He also was one of the Quaker negotiators who attempted to persuade the Archbishop Sancroft to tolerate non-conformists. While he published his thoughts, he was not a noted minister. Like many wealthy Quakers, he became an investor in James II's West New Jersey, and William Penn's Pennsylvania plantations. (8 attributes)

Richard Davies (1635-1708)

Davies became a Quaker as a teenager in Montgomeryshire; his apprenticeship over he set up in business as a felt-maker in London, and married the daughter of a Quaker family at Horselydown meeting, Southwark. The pair would later travel back to Wales as ministers to spread the Quaker message, while Davies took roles at Westminster representing Quakerism

to the (Welsh-speaking) Secretary of State Sir Leoline Jenkins, and later Queen Anne. Davies acted as the distributor of Books in Wales for LYM, and helped set up the Welsh Yearly Meeting. His business was sufficient for him to produce his own trade-tokens, and he also transacted for 5000 acres of Pennsylvania, for which he negotiated resale agreements. (9 attributes)

William Edmundson (1627-1712)

Edmundson was from Westmoreland, and fought under Cromwell before setting himself up as a retailer. Becoming a Quaker around 1654, he became an itinerant minister, and following a meeting with George Fox became a founder member of the Society of Friends in Ireland, negotiating release of prisoners with the authorities, and setting his name to the indenture for the first Dublin Quaker property. He was asked by William Penn to promote the emigration to the Irish, and attended Yearly Meeting in London. He subsequently exchanged 'great trading' in favour of farming, which gave him more time for travel in ministry, including to America and the West Indies. (8 attributes)

David Ferris (1707-1779)

Ferris was born into a Connecticut Congregationalist family, destined for the clergy, but doubts caused him to leave Yale without a degree, and in 1733 he joined the Quakers in Philadelphia. Married, he settled his family in Wilmington and opened a dry goods shop. Some years later, his wealth was such that he co-invested to build a vessel for trade to the West Indies, which business he conducted for some time before reducing his business back to the store's modest profits, which he felt were more 'Quakerly'. An active member of the Wilmington Quaker meeting, he was acknowledged as a minister in 1757. In 1758 he travelled over 1000 miles in this capacity; he attended several Yearly Meetings, and became active in Quaker antislavery activity, while not acting for the Society in state matters. (8 attributes)

John Kelsall (1683-1743)

Kelsall attended a Quaker school (Abbeystead, then Penketh) before holding office as teacher for the Dolobran Quaker Monthly Meeting; he married a Quaker servant of the Lloyd family, before becoming Clerk to Abraham Derby. He does not appear to have been a minister, but business affairs caused him to travel to Bristol, Birmingham, and London, engaging amongst others with Lloyds' business partner William Wood who minted copper coins for the American colonies. Within the society, Kelsall records hosting many travelling Quakers, and attending several Yearly Meetings – then held at Monmouth and at Marlborough. At the latter, he records attempting to negotiate loans from London Quakers in order to support the Lloyds' iron business. (7 attributes)

Samuel Neale (1729-1792)

Neal was born in Dublin to Quaker parents; his father emigrated to America on the death of his mother, and at the age of seventeen Samuel inherited the family estate. Apprenticed to a Dublin merchant, Neale cast off early frivolities to become a travelling minister, and from 1752 travelled widely internationally – ministering in England, Holland, Germany, and America. Twice married to Quakers, he settled near Cork as a partner in a substantial paper manufactory. (8 attributes)

William Rotch (1734-1828)

Rotch ran a Newfoundland whaling concern, and had great influence over the substantial Quaker colony during the eighteenth century. The island was a potential battleground during both the Anglo-French wars, and later the Revolutionary War, and Rotch's Quaker credentials ensured the island achieved neutrality in the conflict. Married to a Quaker, with sons who entered his business, he also partnered his brother, a trader and ship owner: remarkably, his was the first ship to sail into British waters flying an American flag, while his brother's was at the centre of the Boston 'Tea Party'. He negotiated personally with the French government in the years up to the revolution, visiting both Versailles, and Talleyrand. He was a frequent host

for travelling Quakers and ministers; there is no record of his holding office or in ministry. (7 attributes).

Thomas Story (1670–1742)

From a landed background, Story joined the Quaker sect at Broughton in 1691, and having travelled widely in ministry, was appointed Clerk to the London Quarterly meeting. Trained in law, he was used by the Society in several high profile arguments, including representing their pacifist views to Tsar Peter the Great. Subsequently Story was appointed treasurer of William Penn's Pennsylvania Land Company (1701), and represented Penn in America. Married into a Philadelphia Quaker merchant and political family, he travelled widely in the colonies, and also in the Netherlands. (9 attributes)

William Stout (1655-1752)

Stout was member of Lancaster Meeting; from farming stock, Stout was apprenticed to a Quaker grocer, Henry Coward, a successful trader and horse dealer and proto-banker. Coward hosted Quaker meetings during Charles II's repressions. On completing his apprenticeship, Stout invested a sizeable sum owed on his father's estate, sold some land, and borrowed from a sister to fund purchase of stock in London from Quakers. Subsequently he became a trans-Atlantic trader, co-investing with five other Quakers to share the cost of fitting a ship bound for Virginia, there to purchase a cargo for sale in the colonies which would in turn fund the purchase of a cargo of tobacco to be sold on return. Stout also records a transaction sending a substantial value in goods to Philadelphia wholly in the care of an inexperienced young man named George Godsolve, who's uncle was from the Coward family, and also a Virginia factor. Stout was appointed representative at London Yearly Meeting, and acted as both executor and trustee. There is no record of Stout as a minister, or as a representative of the Quakers in state matters. (7 attributes)

DISCUSSION

Our findings have shown how the level of connectedness within the Religious Society of Friends was multi-dimensional, suggesting Quakers in this period exhibited many types of possible connections. This resulted in a high degree of inter-connectedness between nodes across both commercial and non-commercial attributes, facilitating the transmission of different kinds of content, including tangible resources such as financial capital and co-investments, as well as intangible resources which included sharing business contacts, providing support, and market intelligence across national boundaries. The structure of the network shows characteristics of high density and high levels of centrality for all nodes, which in turn suggests a coherent network with low geodesics, allowing resources to be efficiently shared.

Second, the findings show the importance of the Quaker Discipline to the functioning of the network as the individual nodes had ties within key attributes encouraged by the Society, as expressed in the Advices which formed the Discipline. The Discipline conceived as a quasi-regulatory mechanism and a key characteristic of the Quaker tradition is central to a deeper understanding of how religious commercial networks in the long eighteenth century operated in a period characterized by the absence of formalized institutions.

The structure of a network determines how effective an individual node within the network is likely to be in obtaining the resources required – in commercial terms, the advice, opportunity, credit, supplies and logistics to trade. As noted, our findings indicate that the level of attributes in the Quaker network show a high number of both commercial and non-commercial ties. This level of ties reveals a network that is not only dense, but where many nodes are centric and connected to others along multiple paths. Existing studies have also noted that the degree of centrality is key to delimiting both the amount of resources, and the ease with which an individual can access them (Burt, 2009). Low centrality can indicate the presence of isolated nodes, or groups of nodes linked by single paths (or ‘bridges’); such a structure can provide difficulties for nodes to gain access to content or resources. In terms of the Quaker network, the high level of centrality shown by the nodes examined suggest that the

structural ‘holes’ in the network (eg, see Burt, 1992) are likely to be less prevalent, as (in consequence) are any bridges, which suggests that access to the commercial benefits of the network are likely to be relatively widespread. This type of low centrality speaks to Quaker theology and belief in equality, whereby all members of both sexes, and regardless of worldly status, are considered equals before God (Burton, 2017).

The Quaker network typography also underpinned the development of religious social capital. Coleman (1988; 1990), for example, viewed social capital as arising from closed and interconnected groups that encourage behavioural norms and demarcate group boundaries. The attribute of membership and adherence to the Discipline effectively bounded the Quaker network and gave rise to prosocial norms of cooperation and trust. The network served to generate high-levels of bonding social capital (Adler and Kwon, 2002; Inkpen and Tsang, 2005) but also served to resist the separation and competition between market and religious logics. Advices reminded Quakers of the ‘unprofitableness of the whole world, compared with one immortal soul ; and yet many are pursuing a delusive portion of it...[through] extensive schemes in trade, and fictitious credit to support them.’ (Extracts, pp197-198). Such advice reinforced the common culture (as well as increased the effectiveness of governance) and the behavioural norms of the Quaker tradition, but only to the extent of co-religionists. The role of religious social capital in serving to increase social bonds is not new, however its key role in encouraging an alignment in market and religious logics extends existing research beyond the idea of religious capital being restricted to ‘church work’ (eg, Baker and Miles-Watson, 2008; 2010) and the incompatibility of market and religious logics (eg, Gumusay, 2020)..

Joining the Religious Society of Friends entitled the new member to access a dense, centric network, populated by many commercially-active individuals who were both accessible and motivated to assist in ensuring financial independence for the newcomer. Thus while over time, iteration across dyadic or multiple ties could engender a strengthening in that tie, the commercial context for an individual in membership was *ab initio* more fertile than for

one outside, as a direct result of the attributes of membership required and imposed by the Society. The attributes required by membership – and subsequent adherence to the Discipline (which we shall discuss shortly) – ensured that the network had an attribute-based character that substituted for repeated iteration.

Rowley (1997) has suggested that the existence of multiple ties with a common set of moral norms increases the effect of such norms upon the behaviour of nodes in a network. As noted, entry to and continued membership of the Religious Society of Friends required individuals to abide by an accepted set of rules which were contained in the Advices, and monitored by the Disciplinary process, with the final sanction of expulsion for those who did not comply (Extracts, pp.42-51). Following Rowley, this would indicate that individual non-adherence to Discipline would become more difficult since all nodes acted to reinforce Quaker norms. Although there are examples of members failing to follow the Advices, this was rarely for errors in commercial activity (Sahle, 2018);² continued membership entailed adherence, and failure could result in exclusion from the network and its benefits. This helped ensure fairness and integrity in dealing with each other (both within and outside the membership), which enabled membership itself to act as a proxy for the trust built up in other networks through iterative transactions. The effectiveness of the governance of the Quaker Discipline was enhanced by the potential for multiple ties. The common Quaker attribute of membership increased the likelihood of multiple ties and served to reinforce Rowley's cultural homogeny. While the organisation itself is not the focus of our study, this places the early modern Society of Friends in an interesting, intermediate position in the genesis of formal organisations noted by Keiser: between a medieval Guild (aligning its goals to correspond to members' value systems) and most modern organizations (where 'membership is tied predominantly to the formal recognition of membership rules') (Keiser 1989, p546).

² Discipline was predominantly engaged with failures to follow advice on marriage, with conduct (drinking, gaming, or even swearing) accounting for the majority of other instances.

Vu and Burton (2020) suggested that Quakerism can be located within MacIntyre's (1988) conception of a tradition, and Discipline is a key characteristic, albeit an evolving one. It displayed characteristics of governance which are analogous to a quasi-regulatory or professional body, where membership requires (and certainly implies) known standards of commercial conduct. Membership entailed adherence to the Discipline, which in turn demanded behaviours which were designed to prevent damage to the reputation of the Society of Friends. This may have also been effective in terms of regulating transaction costs. Baldwin (2008), for example, suggested that commercial interactions will incur costs *ex-ante* (eg, specification of contracts) or *ex-post* (eg, effort of associated surveillance for compliance). The Quaker membership process and adherence to the Discipline may have reduced transaction costs *ex-post* for members of the network, since the governance process of the Society acted to select members based on attributes (eg, a commitment to the Discipline) and regulate ongoing behaviour and compliance. Further, *ex-post* costs - represented by the costs (and opportunity costs) of repeated iteration - were rendered less vital since building trust through iteration was reduced - if not removed. In other words, the *ex-ante* costs of membership and commitment to Discipline may have acted as a mechanism to minimize *ex-post* transaction costs which may, in turn, have contributed to the efficient functioning of the network.

As noted, a dedicated section of the Extracts described the governance process of the Society of Friends. The section on marriage (Extracts, pp.62-72) required endogamy amongst members in order to ensure that all associated with the Society were subject to the Discipline to facilitate reputation risk management; the responsibility for this extended to households with servants (Extracts, pp.73-75), and extended to apprentices (eg. Extracts, p122, p148, p169). Financial dealings were described under a section for Trade (Extracts, pp.195-200), which amongst other things required members to restrict themselves to moderation in trade, and take only commercial risks to losses they could bear personally (Extracts, p.195). Members were expected to pay debts when they fell due, to eschew paper credit, and accept

that they remained obliged to pay debts even after composition with creditors – which removed the option of bankruptcy (Extracts, pp.196-7). In case of dispute, a section gave Advice on Arbitration, conducted by a panel of fellow Quakers (Extracts, pp.5-10); the outcome of such, indeed any decision within the Society, could be challenged through the hierarchical Appeals process (Extracts, pp.2-4). Travel was monitored through the detailed Removals and Settlements process (Extracts, pp.160-168) by which paper certificates would be granted on application to those who were sound in conduct, free of matrimonial obligation, and importantly, had not received financial relief from the Society for a period of years (Extracts, p.166).

This emphasis on financial solvency facilitated the broadening of the business network through acting effectively as a commercial reference, suggesting the individual in possession of such was known to be credit-worthy; this reflects the review of Hoang and Antoncic (2003) who noted the importance of reputational or signalling content within transmissions, which facilitate resources from co-investors by acting as moderators of risk for individual node, and which in turn help optimise resource exchanges. Quakers intending to branch out into new areas of business were told to seek the advice of experienced members (Extracts, p.196) providing an example of the content transmission embedded in the Discipline. All members engaged in trade were expected “to keep their accounts in such a clear and accurate manner, that in case of failure, their creditors may see how the deficiency has happened”; the governance process required “friends, who may be appointed by monthly meetings to visit those who have failed, should always inquire of their assignees or trustees how they have acted in the above respects, and report to the meeting.” (Extracts, p.197). The existence of such detailed governance of the membership in such matters is highly suggestive that while network density could facilitate commercial activity, the Quaker network possessed a set of norms which regulated dealings across nodes.

CONCLUSION

This study sought to add to our understanding of the mechanism(s) by which the Religious Society of Friends, as a small Christian sect originating in England in the mid seventeenth century, rapidly created a trans-Atlantic commercial network with a reputation for business integrity. Using data gathered from a sample of early modern commercial Quakers, we viewed that network through a lens drawn from Social Network Analysis, and assessed three key characteristics of connectedness, governance, and structure. Our findings indicate a highly-connected set of individuals; a network where admittance and continued access were regulated according to adherence to a set of ethical norms created by the Quaker governance mechanism known as the Discipline; and which had a role in creating a dense network structure in which individual nodes had multiple connections with others.

Having established the characteristics of the network, we examined the relationship between the attributes displayed by the individuals and the requirements of the Discipline, as expressed in the Advices, and show how these network characteristics were an outcome of the norms required by the Society of Friends. That the network exhibited norms which promoted ethical responsibility was the result of the requirement of the Discipline which was to manage reputational risk; that these norms also promoted ethical business was a subsidiary goal. That the network characteristics facilitated entrepreneurial and commercial activity was also a secondary effect. Obtaining membership of the Religious Society of Friends required acceptance of the governance mechanism of the Society; this, we argue, acted as a proxy for trust and thereby reduced the requirement for repeated iteration. Membership thus offered an immediate benefit to those seeking to develop their commercial network; indeed (given the potential of international credibility and trust facilitated by the certification process) membership offered individuals access to an efficient and well-functioning network of trans-Atlantic business contacts, as well as opportunities which some (possibly many) would have had difficulty accessing elsewhere during the long eighteenth century.

We cannot draw firm conclusions as to whether or not access to such a network would have been an instrumental motivation for those in the period to join the Society. Certainly,

such a secular utility might help explain the historic conundrum as to why the Society of Friends grew during periods (largely before the Act of Toleration in 1689) when Quaker behaviour often ran counter to both civil and ecclesiastical law. It may be possible that becoming a member was not through some faith but through an instrumental desire to access the network. However, it should be noted that during the period, religion (as a means of salvation) had its own utility, and it may simply be that Quakerism was a practical choice for the commercial individual in every sense.

However, over time Quakers gradually withdrew from business. Many explanations have been articulated – transgenerational succession problems and the introduction of corporate law in the mid-nineteenth century which formalized institutional regulatory mechanisms (Burton, et al., 2019), the increasing ‘professionalism’ of an ever more middle-class membership, (Walvin, 1997) or even expulsion (Tibbals, 2017). While the factors that may have contributed to the decline in Quaker involvement in commerce is complex and multi-faceted, all would have depleted the number of Quakers in membership to an extent that it weakened the efficacy of the Quaker network. As an evolving tradition, by the early twentieth century there is evidence of Quakers leading less ‘plain’ lives as their success grew (Stroud and Dandelion, 2005), and the focus of the Discipline also adapted with each generation, ultimately causing the ‘divided mind’ with religion on the one hand and business on the other (Castle, 1941); a conflict between market and religious logics which reduced the efficacy of the network still further. Further work on understanding the decline and changing shape of the Quaker network in the nineteenth and early-twentieth century would be invaluable.

Finally, we have examined an important, albeit small, religious network. Our findings suggest that social networks based upon religion provided benefits (at least temporarily) in a commercial context due to breadth in network ties and adherence to a set of ethical norms. This proposition warrants further research. Further research into other networks with a

common religious bond during this period (perhaps those of the Jewish community, or the emerging network of Methodists) would also enable further themes to emerge for both characteristics and governance. Quantitative and mixed method studies with large data sets would be especially valuable. Finally, we would welcome research that considers the possibility that shared religious bonds detriment the efficient functioning of a social network. For sure, in the Quaker context the functioning of the network declined in the early-part of the twentieth century. A deeper understanding of these mechanisms would help advance research in this field.

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