The Professionalization of Cryptology in Sixteenth Century Venice

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Abstract

This article examines the evolution of cryptology as a business trait and a distinct, state-regulated and controlled profession in sixteenth century Venice. It begins by briefly discussing the systematic development of cryptology in the Renaissance. Following an examination of the amateur use of codes and ciphers by members of the Venetian merchant and ruling class, and subsequently by members of all layers of Venetian society, the article moves on to discuss the professionalization of cryptology in sixteenth century Venice. This was premised on specialist skills formation, a shared professional identity, and an emerging professional ethos. The article explores a potential link between the amateur use of cryptology, especially as it had been instigated by merchants in the form of merchant-style codes, and its professional use by the Venetian authorities, and it adds the profession of the *cifrista* – the professional cipher secretary – to the list of more "conventional" early modern professions.

In one of the most widely cited scholarly works on the historical development of cryptology, David Kahn argued that the "growth of cryptology resulted directly from the flowering of modern diplomacy."[1] While this contention remains the conventional wisdom, it does not adequately explain the distinctive course that professional cryptology took in a commercial and maritime empire like Renaissance Venice. There, the ruling class, who were actively engaged in international trade,[2] could not see a distinction between trade and politics, as political affairs could affect one's business and livelihood, and commercial pursuits could have diplomatic implications.[3] For this reason, protecting vital information though code-words and symbols was not an uncommon commercial practice. Andrea Barbarigo, for instance, a renowned Venetian merchant, already by the 1430s was using his own cipher for his confidential communication with his business agent in the Levant.[4] In the early 1500s, Andrea Gritti, a young merchant and future Doge of Venice, used commercial jargon as a code,[5] in order to send intelligence to his motherland from Constantinople.[6] The Venetians had even coined a term for this encoding

1 Kahn, *The Codebreakers*, 108.
2 See Romano, *Patricians and Popolani* and bibliography therein.
3 Sardella, *Nouvelles*, 90.
4 The cipher is in ASV, *Archivio Grimani-Barbarigo*, busta (hereafter b.) 4, Reg. 1, c.158 r.; See also, Lane, *I mercanti*, Illustration 2. On Barbarigo, see Lane, *Andrea Barbarigo*.
5 A code is a method of altering the meaning of a message, while a cipher is a technique that hides the message by changing the characters in which it is presented. See Kahn, *The Codebreakers*, xiii-xv.
6 Davis, "Shipping and Spying." A code is a method of altering the meaning of a message, while a cipher is a technique that hides the message by changing the characters in which it is presented. See Kahn, *The Codebreakers*, xiii-xv.

approach, *lettere mercantili,* that is, "mercantile letters."[7] Yet, the same Venetian ruling class that invented amateur ways of concealing trade secrets through "mercantile letters" prompted the development of a fully-fledged, state controlled and regulated professional cryptology department housed in the Doge's Palace. What was the link between such commercial encryption practices and the professionalization of cryptology in sixteenth century Venice?

In Renaissance Venice, business – that is trade and industry – and statecraft were blurringly intertwined. Historical academic literature has overwhelmingly ignored any commercial origins of the historical development of cryptology, focusing primarily on the gradual increase in complexity and sophistication of ciphers, as they developed through the centuries. Indeed, in over 1000 pages of his path-breaking book – a work of gargantuan extent, both in chronology and geography – David Kahn offers a sweeping review of cryptology's historical development from ancient times to the present.[8] In his discussion of the evolution of early modern cryptology, however, Kahn overlooks a significant development of that period: the progressive transformation of the discipline from an intellectual activity of a handful of gifted individuals in the employ of Italian and European princes, into a state-controlled and regulated profession premised on specialist skills formation by means of professional training.

More specifically, Kahn's synthetic account of cryptology in the early modern era centres on three distinct characteristics: cryptology as an emblem of the intellectual prowess of spirited philomaths and polymaths who operated within the broader context of erudition that pervaded the Renaissance period; cryptology as an instrument of statecraft, used by governments to protect *arcana imperii* (the secrets of the state); and the gradual sophistication of early modern ciphers.[9] Undoubtedly, the instrumentalization of cryptology for political imperatives intensified in the period after the fifteenth century, that saw the systematic development of embassies and, by extension, diplomacy.[10] It is not accidental, therefore, that scholars who explored the development of cryptology in that period, upon whose work Kahn built his own narrative, focused on these particular aspects of cryptology.[11] A fresh attempt to explore extant archival material, however, reveals an overlooked facet of the evolution of cryptology: its systematic development into a distinct professional service.

Combining an analysis of early modern archival material with modern sociological concepts and theorizations of professionalization and secrecy, and piecing together scattered

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7 See, for example, ASV, CX, *Deliberazioni Secrete*, Reg. 9, cc.126v.-127r. (26 Jan. 1571).
8 Kahn, *The Codebreakers*.
9 See articles published in the journal *Cryptologia*.
10 See the classic work of Mattingly, *Renaissance Diplomacy*. For recent revisionist debates, see Lazzarini, *Communication*; Lazzarini, "Renaissance Diplomacy," in *The Italian Renaissance State*, eds. Gamberini and Lazzarini; Frigo, "'Small States'", in *Politics and Diplomacy*, ed. Frigo; and Senatore, "*Uno Mundo de Carta*."
11 Amongst the most comprehensive works on early modern cryptology are Cecchetti, "Le Scritture Occulte;" Meister, *Die Geheimschrift*; Kahn, *The Codebreakers*, esp. chs. 3 and 4.

information emanating from the most renowned historical works on the subject, this article revisits the history of early modern cryptology and reveals its professionalization, that is, its systematic organization and development into a distinct professional service based on "cognitive specialization."[12] This service was annexed to the Venetian ducal chancery, the civil service organization that housed the Venetian state bureaucracy,[13] and oversaw several cryptology functions, including cryptography, cryptanalysis, deciphering and, astonishingly, the development of a well-defined training and development regime for state cryptologists. As such, this article adds the profession of the *cifrista* – the professional cipher secretary – to the list of more "conventional" early modern professions, such as those of the priest, the lawyer, the doctor, the secretary, the notary, the accountant, and, of course, the merchant.[14]

To this date, aside from a few scholarly accounts that reveal only certain aspects of its history,[15] no historian has attempted to reconstruct the full picture of the Venetian cryptology service. In consequence, our understanding of the systematic professionalization of cryptology by the Venetian authorities remains limited. Addressing this lacuna, this article reveals three idiosyncratic characteristics that distinguish this service from some of the more rudimentary cryptologic pursuits of other early modern states. Firstly, the gradual transformation of cryptology from an intellectual pursuit into a state controlled and regulated profession that was grounded on *ammaestar*,[16] that is, the mastery of the "difficult and most significant science" of cryptology through professional training and development.[17] It was also based on mainstream human resource practices, such as talent acquisition, recruitment and selection, and performance appraisals, amongst others. Secondly, the social construction of the professional identity of the *cifrista* that was premised on inter-generational favouritism and professional isolationism. And thirdly, the development of an internal school of professional cryptology, set up for the professional training of specialist cryptologists and all other state secretaries whose professional responsibilities entailed enciphering and deciphering official documents.

The article's main contention is that it is this particular aspect of specialist skills formation through continuous professional training, in combination with a nascent professional identity, even an incipient professional ethos and philosophy, that signifies the emergence of a stand-

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12 Larson, *The Rise of Professionalism*, 3.

13 The historiography on the Venetian ducal chancery is vast. For an overview, see De Vivo, "Ordering the Archive;" De Vivo "Cœur de l'Etat." On a fresh historiographical perspective on chanceries in late medieval and early modern Italy, see De Vivo, Guidi, and Silvestri, eds., *Archivi e archivisti*.

14 Generally on "learned professions" and professionalization in the early modern period, see O'Day, *The Professions*, 18-43. On professions in Renaissance Italy, see Biow, *Doctors*; On professional notaries in early modern Venice, see Pedanis Fabris, *"Veneta Auctoritate Notarius*;*"* On the emergence of professional accounting, see Goldthwaite, "The Practice." The bibliography on professional merchants in the late medieval and early modern period is vast. For emblematic case studies, see Lane, *Andrea Barbarigo*; Lane, *I mercanti*.

15 See, for example, Cecchetti, "Le Scritture;" Pasini, "Delle scritture;"; Preto, *I servizi segreti*.

16 ASV, CX, *Deliberazioni Secrete*, Reg. 19, cc. 18v.-19r. (30 July 1636).

17 ASV, CX, *Deliberazioni Secrete*, Reg. 14, c. 127r. (31 Aug. 1605).

alone profession of cryptology in early modern Venice. This was clearly distinct from the widely diffused, yet amateur use of codes and ciphers by members of all layers of Venetian society. The idiosyncrasy of this amateur approach lied in the use of commercial jargon, as it was pioneered by Venetian merchants, to protect secret communication. The article explores the suggestion that the amateur use of codes as a mercantile custom, in combination with sixteenth century political and economic value judgements may have influenced, even conditioned, the gradual professionalization of cryptology in sixteenth century Venice.

The article starts by briefly introducing the broader socio-political context in which the professional use of ciphers proliferated. It then examines the amateur use of codes and ciphers primarily by members of the Venetian ruling class who were actively involved in international trade, and consequently by members of all layers of Venetian society who, schooled in the city's mercantile traditions, used commercial jargon to camouflage clandestine communication. Subsequently, the article discusses the systematic evolution and organization of a distinct cryptology department, created, managed, and protected by the Venetian government. The article concludes with some reflections on a potential link between the mercantile custom of the amateur use of ciphers and the professionalization of cryptology in sixteenth century Venice.

The Professional Use of Ciphers in the Renaissance

The proliferation of the professional use of codes and ciphers started in the long *Quattrocento*, the century that saw the methodical systemization of diplomatic activities, both in Italy and in Europe.[18] The gradual intellectualization of cryptology in that period, that steadily made its way through the printing press, was instrumental in this proliferation. More specifically, the publication of several cryptologic treatises and manuals penned by Renaissance polymaths, including Leon Battista Alberti's *De componendis cifris* (1466) and Johannes Trithemius's *Polygraphia* (1518),[19] influenced significantly the transformation of cryptology from an esoteric practice to an applied *Scientia*.[20] Of great importance in this process was the publication of Cicco Simonetta's (1474) *Regulae extraendis litteras zifferatas sive exempio*.[21]

Simonetta, a longstanding state secretary in the duchy of Milan, one of the most meticulously informed cities in the late medieval period, was one the first professional cryptologists to be employed in state administration.[22] Especially under Francesco Sforza, "the

18 Lazzarini, *Communication*.
19 The work was only published in the vernacular in 1568.
20 On cryptology as an esoteric practice, see Jütte, *The Age of Secrecy.*
21 "Rules for deciphering enciphered documents without a key." See Perret "Les règles."
22 On Simonetta and cryptologists of the Milanese chancery, see Cerioni, *La diplomazia Sforzesca*; On state secretaries in early modern Europe, see the essays in Dover, ed. *Secretaries and Statecraft*.

'signore di novelle' par excellence,"[23] an efficient network of intelligencers and diplomats contributed to steady stream of information for political and diplomatic purposes.[24] For this reason, Milan pioneered the systematic use of clandestine modes of communication, upon which overseas diplomatic missions were based.[25] Simonetta was primarily responsible for the Milanese secret chancery in the second half of the fifteenth century.[26] Likely under his direction, the numerous ciphers of the Milanese secret chancery were systematically ordered and classified for the benefit of diplomats and military governors of the Sforza.[27]

Sophisticated ciphers for diplomatic purposes were in use in the Italian peninsula from the beginning of the fifteenth century. Already in 1401, the dispatches from Mantua to the Mantuan chancellor Simone de Crema were encrypted through multiple cipher representations, rendering the task of codebreaking extremely arduous.[28] At the dawn of the sixteenth century, the professional operation of ciphers by specialist operatives was, in a way, formally sanctioned by the emergence of the term *cifrista*, the professional cipher secretary. The term seems to have been created in Venice,[29] and half a century later it was widely used in Rome, where the *office of Cipher Secretary to the Pontiff* was introduced in 1555. The Pope's first recorded cipher secretary was Triphon Benicio de Assisi.[30] Still, it was Giovanni and Matteo Argenti, uncle and nephew, who between them served five Popes from 1585 to 1591 and from 1591 to 1605 respectively, that lay claim to fame as Rome's most renowned cipher secretaries in that period.[31]

Professional cipher secretaries were employed in several European princely courts, especially those that made part of vast territorial states. Henry III and Henry IV of France found their expert code-breaker in the mathematician and lawyer François Viète de la Bigotière (1540-1603).[32] Spain's systemization of the professional use of ciphers took place primarily under the reign of Philip II. Coded diplomatic correspondence was managed in the *Despacho Universal*, a specialist branch of the *Secreteria de Stato*.[33] Eventually, the emergence of Black chambers – the

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23 Lazzarini, *Communication*, 47.
24 Senatore, *"Uno Mundo de Carta."*
25 Ibid.
26 Cerioni, *La diplomazia Sforzesca*, Vol. 1, xviii-xix.
27 Ibid., ix-xx.
28 Kahn, *The Codebreakers*, 107. On diplomacy in late medieval Mantua, see Frigo, "'Small States'," in *Politics and Diplomacy*, ed. Frigo.
29 Preto, *I servizi segreti*.
30 Mollin, *Codes*, 58.
31 On Matteo Argenti, see Meister, *Die Geheimschrift*, 148-170; On Matteo Argenti's codes, see Villain-Gandossi, "Les dépêches chiffrées."
32 Devos, *Les chiffres*, 29-30.
33 On Spanish ciphered correspondence, see Allaire, "Le Décodage," in *Correspondre*, ed. Albert. On the ciphers of Philip II, see Devos, *Les chiffres*; For an overview, see Couto, "Spying," in *Correspondence*, eds. Bethencourt and Egmond, 296-299.

secret rooms where professional cryptologic pursuits took place – from the seventeenth century onwards, is suggestive of the systematization of the professional use of ciphers.[34]

While historiography has explored the professional use of ciphers in the early modern period, the evolution of the discipline from an intellectual activity to a stand-alone and even state-regulated profession has received less attention. Two reasons can account for this. Firstly, the conventional portrayal of early modern bureaucracies as unsystematic and lacking professional specialization.[35] Yet, to overwhelmingly dismiss early modern state bureaucracies as "unsystematic" because they did not display the high levels of rationality, maturity, and sophistication of contemporary ones entails discounting *tout court* the value of our historical understanding of more distant administrative practices on which nascent state bureaucracies were premised throughout the early modern period.

Secondly, early modern codes and ciphers have been deemed rather unsophisticated – by contemporary standards – to merit comprehensive study by historians.[36] This contention, however, fails to account for the systematic proliferation of Black Chambers in several areas of central Europe from the seventeenth century onwards, or the widespread diffusion of cryptology in eighteen century political practices.[37] Surely, cryptology has historical origins and, in order to investigate them, it is necessary to zoom out of the narrow focus on the level of complexity (or simplicity) of early modern codes and ciphers, in order to explore the political and wider socio-economic context in which they developed. In the following section, we start from the latter in order to understand the socio-economic landscape in which clandestine written communication proliferated in that period. For Venice, one of the most potent commercial powers in the early modern world, the use of codes and ciphers seems to have been instigated, even sanctioned, by merchants, primarily to conceal information that influenced their business affairs.

The Amateur Use of Codes and Ciphers in Early Modern Venice

As scattered archived information suggests, the use of encryption in the written communication of businessmen such as merchants, bankers, and their agents was not uncommon in the medieval and early modern period. Tomaso Spinelli, for example, the famed Florentine banker and patron of Renaissance architecture, used a cipher to communicate business instructions to his brother,[38] just like the Venetian merchant Andrea Barbarigo did with his business agent Andrea Dolcetto.[39]

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34 The history of Black Chambers is substantial. Amongst others, see Vaillé, *Le cabinet noir*; De Leeuw, "The Black Chamber."
35 See, for example, Carter, *The Western European Powers*.
36 See, for instance, Buonafalce, "Bellaso's Reciprocal Ciphers."
37 De Leeuw, "Cryptology," in *The History*, eds. De Leeuw and Bergstra, 331-332.
38 Jacks and Caferro, *The Spinelli of Florence*.
39 Lane, *Andrea Barbarigo.*

Undeniably, the codes and ciphers used by these individuals were quite rudimentary in nature. Yet, they are indicative of the need to protect information that was vital to their business affairs. Cryptographic manuals published in that period assert the significance of cryptography for merchants, reinforcing the idea that encryption was a significant mercantile custom. *Opus novum*, one of the earliest cryptographic treatises to be published (1526), was, according to its author, a book for merchants and anyone else who sought ancient and contemporary encryption techniques.[40] In it, Jacopo Silvestri proposed methods that could be easily deployed by merchants and any men or women who wished to keep their letters, books, and accounts secret.[41]

Merchants' use of codes and ciphers was not only intended to protect trade secrets; it undergirded their diplomatic activities. Already from the medieval period, it was customary for Italian merchants to be directly or indirectly involved in diplomatic and political affairs.[42] Genoa's idiosyncrasy, for example, as a major commercial centre with no territorial expansion meant that diplomatic negotiations were conducted by mercantile and economic agents, while official legates were solicited only for the most formal of occasions.[43] Early diplomatic studies attributed Italian merchants' involvement with diplomacy to their dexterity in the art of negotiation.[44] Yet, the robust research tradition in Italian commercial networks has overlooked the diplomatic role of merchants.[45] Thus, further research is needed to shed more light on mercantile diplomatic activities in the medieval and in the early modern period. Nevertheless, Italian merchants' undisputed diplomatic interventions were so prominent that, as Isabella Lazzarini aptly put it, "If there was a lack of ambassadors, there was no lack of merchants."[46]

In the case of Venice, a major commercial entrepôt with territorial expansion over several areas of Northern Italy, the Adriatic, and the islands of the Levant, this contention holds great merit. Venice's territorial expansion necessitated the formal organization of the state's diplomatic representation by means of resident ambassadors.[47] Still, there were times when ambassadors, or the lack of them, called for the diplomatic support of merchants.[48] The political tribulations of the late *Quattrocento*, for example, especially in terms of the tumultuous Ottoman-Venetian relations, meant that Venice had to rely on her large merchant community in

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40 Silvestri, *Opus novum*, 1526.
41 Ibid., fol. 13 r.
42 On the enmeshment of the commercial and diplomatic activities of Italian merchants in the late medieval period, see Lazzarini, "I circuiti mercantili," in *Il governo dell' economia*, eds. Tanzini and Tognetti. Specifically on Italy and the Iberian Peninsula, see the essays in Tanzini and Tognetti, eds., *Il governo dell'economia.* On the informative nature of merchants' written communication, see Trivellato, "Merchants' Letters," in *Correspondence*, eds. Bethencourt and Egmond.
43 Shaw, "Genoa," in *The Italian Renaissance State*, eds. Gamberini and Lazzarini.
44 See the classic work of Von Reumont, *Della diplomazia*.
45 See, for example, Sapori, *Studi di storia economica*; Melis, *I mercanti italiani*.
46 Lazzarini, *Communication*, 40.
47 On Venetian ambassadors, see Queller, *The Office*.
48 See, for example, Luzzatto, *Studi di storia economica*; Lane, *I mercanti*.

Constantinople for both diplomatic representation and intelligence gathering. In the late 1490s, in particular, Venice was left without a formal envoy in the Ottoman capital, as the Venetian ambassador had been expelled from the city, having been discovered to spy for the Spanish.[49] At that point in time, the young merchant and future Doge of Venice Andrea Gritti took the reins of both commercial and diplomatic negotiations. In 1497 he convinced the Sultan to overturn the embargo on grain export that the Ottomans had imposed on Italian merchants in Constantinople.[50] In 1503 he also successfully negotiated the final details of a peace treaty between Venice and the Ottoman Empire.[51] His missives to the motherland were overflowing with intelligence on the size and moves of the Ottoman fleet. To divert suspicion he coded his dispatches in commercial jargon and presented them as business communication instead. Once he sent a letter informing the authorities that new products were arriving in Venice from sea and land, meaning that the Ottomans were preparing to attack with their fleet and army.[52]

The technique of substituting specific words with inconspicuous code-words was a widely popular method of encoding called *in parabula* or the *Cicero method*.[53] According to an unpublished cryptologic treatise that the Council of Ten adopted as a training manual for their professional cryptologists, the specific use of mercantile jargon that appeared innocuous to the unsuspected reader had been in use for centuries.[54] The Venetians, who were adept at camouflaging information of political nature with commercial jargon, simply termed this approach *lettere mercantili*. So extensive was the use of this cryptographic method amongst Venetian merchants that the renowned papal cipher secretary Matteo Argenti went as far as to attribute its development and diffusion to the Venetians who,[55] as seasoned travellers and dealers in both merchandise and news, had developed a flair for inventiveness in secret communication.

Eventually the *Cicero method* became widely used not only in Venice but in other parts of Europe, including England and France.[56] Writing from France, a fervent user of the *Cicero method* was the famed Dalmatian printer and publisher Bonino di Boninis. Between 1494 and 1554, during the Italian Wars, Di Boninis acted as a spy for the Venetian authorities, working in close collaboration with the Venetian ambassador in France.[57] While stationed there, he sent several encoded missives in the style of "mercantile letters" to Venice reporting on French

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49 Davis, "Shipping and Spying."
50 Sanudo, *I diarii*, vol. I, 508.
51 Lane, *Venice*.
52 Davis, "Shipping and Spying," 101-102.
53 On the history of the *in parabula* method, see Couto, "Spying," in *Correspondence*, eds. Bethencourt and Egmond, 292-294; Strasser, *Lingua universalis*, 23-25.
54 ASV, *Inquisitori di Stato*, b. 1269, fols. 25v.-26r.
55 Meister, *Die Geheimschrift*, 92.
56 On instances of the Cicero method in English letters, see Daybell, *The Material Letter*, 152-158.
57 See for, example, ASV, CCX, *Dispacci Ambasciatori*, b. 9 (2 Feb. 1501); ibid., (30 Apr. 1501). On Bonino di Boninis as an informer of the Venetians see Dalla Santa, "Il tipografo."

affairs. One of his letters informed the authorities of prices and dispatches of books from France, which, in reality, meant news from that country.[58]

Di Boninis's case suggests that a rather simple encoding technique that was primarily used by merchants had started to spill over other layers of Venetian society beyond the merchant class, to include foreigners who were either Venetian subjects, emanating from Venetian colonies, or others living or trading within the Venetian state. The authorities took advantage of these people's expertise and, on several occasions, tasked them with clandestine missions. The well-documented case of the Sephardic Jewish merchant Hayyim Saruk from Thessaloniki is a case in point.[59] In 1571, during an ongoing war between Venice and the Ottoman Empire, the Venetian authorities appointed Saruk to travel to Constantinople to spy on "the affairs, designs and military equipment of the Turks."[60] For this purpose he was asked to produce a self-made codebook made up of 184 code-words, in which he coded the Ottomans as "drugs", people as "money", and, quite sardonically, the Pope as a "rabbi."[61] His compensation for this mission reached the amount of 500 ducats for one year's work,[62] a staggering sum, if we take into consideration that over half a century later, the starting salary of a professional cryptanalyst, that had remained stagnant for nearly a century, was roughly fifty ducats annually.[63]

While emanating from different cultural and social backgrounds, Gritti, a genuine Venetian nobleman and merchant, and Di Boninis and Saruk, two well-to-do foreigners who conducted their business affairs in the Republic, were proficient in the use of merchant-style codes. Yet, the *Cicero method* was not only reserved for the noble and the prosperous. So diffused had it become by the sixteenth century, that it had reached the lowest echelons of Venetian society, which comprised the mass of skilled and unskilled manual labourers.[64] It seems that in a city where pretty much everyone had a service to sell, modes of covert communication were used by members of all strata of Venetian society, especially as part of espionage services rendered to the Venetian government in exchange for benefits.[65] Criminals and convicts were a consistent pool from which the Venetian authorities drew information gatherers and amateur spies, primarily on account of their audacious personalities,[66] or due to their intent to have their punishment revoked, or even simply because the government could coerce them into action.

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58 Preto, *I servizi segreti*, 269.
59 On Saruk, see Arbel, *Trading Nations*, especially chapters 6 and 7.
60 ASV, CX, *Deliberazioni Secrete*, filza (hereafter f.) 15 (23 Nov. 1571; 30 Dec. 1571).
61 Ibid.
62 ASV, CX, *Deliberazioni Secrete*, Reg. 9, c. 189v. (23 Nov 1571).; ASV, CX, *Deliberazioni Secrete*, f. 15, (23 Nov.; 30 Dec. 1571)
63 ASV, CX, *Deliberazioni Secrete*, Reg. 19, c. 18r.-v. (14 July 1636).
64 On Venetian social classes, see Romano, *Patricians and Popolani*.
65 See, for example, Iordanou, "What News on the Rialto?"
66 Preto, *I servizi segreti*, 247. On amateur agents and "diplomacy from below" in the early modern period, see articles in Maartje van Gelder and Tijana Krstić, eds. "Cross-confessional Diplomacy."

One striking example of a banished felon turned secret agent is that of Giovanni Antonio Barata. In the early 1570's, at the break of a war with the Ottomans, the Venetian Republic was desperate for information on military developments in the Ottoman capital. Accordingly, Barata accepted to have his banishment revoked in exchange for travelling to Constantinople to spy on the Turks. Importantly, he was ordered to report back to Venice by means of "mercantile letters." For this reason, he created and presented to the authorities a code-book that was made up of terms commonly used by merchants.[67] Conscious of his hazardous mission, the Venetian authorities took his wife and young children under their wing while he was on duty, relocating them from Milan to the Venetian city of Bergamo, and providing them with a monthly stipend, which turned into a permanent yearly pension for his widow when, nearly one year later, Barata was captured and decapitated in Constantinople.[68]

Undeniably, the various users of the *Cicero method* mentioned here came from different cultural and socio-economic backgrounds. Yet, from Andrea Barbarigo and Andrea Gritti in the fifteenth century, to Hayim Saruk and Antonio Barata in the sixteenth, it seems that, by the late 1500s, simple modes of encryption, through the substitution of specific words with inconspicuous code-words or symbols, seems to have been diffused to all layers of Venetian society, and used by people from all walks of life. This diffusion is manifest in an array of contemporaneous publications, ranging from cheap-printed pamphlets and writing manuals,[69] to mathematically grounded cryptologic treatises. In 1546, for instance, the charlatan Leonardo Furlano published a pamphlet on writing in cipher. His intended "readership," according to his work's title, comprised every faithful Christian, including any illiterate individual who could have the work recited at home or in the workshop.[70]

It is important to emphasise here that the use of merchant-style codes was a basic and rather amateur mode of encryption. The choice of commercial jargon, especially in a commercial state like Venice, does not seem to be fortuitous. While the absence of surviving records does not allow for an accurate reconstruction of the amateur use of cryptology by the Venetian merchant class and its diffusion to members of all social strata in Venice,[71] the documented deployment of such codes primarily by merchants, the undisputed mention of code-writing as an important

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67 ASV, CCX, *Lettere Secrete*, f. 7 (17 Feb. 1571); ASV, CX, *Deliberazioni Secrete*, Reg. 9, cc.126v.-127r. (26 Jan. 1571).

68 Ibid., c.198r. (15 Dec.1571).

69 For examples of contemporaneous writing manuals that referred to ciphers and were published in Venice, see Furlano, *Opera nova*; Capaccio, *Il secretario*. For such publications published in other parts of Italy, see, for instance, Fedeli Piccolomini, *Della nuoua inuentione*; Palatino, *Libro nuovo*. I am grateful to Alex Bamji and Rosa Salzberg for sharing their relevant knowledge with me.

70 Salzberg, "The Word on the Street," 341.

71 The use of codes and ciphers by merchants and tradesmen is, to this day, largely unexplored. Specifically for Venice, this can be attributed to the limited number of surviving merchants' letters in the Venetian state archives. See Mackenney, "Letters."

mercantile tool in contemporaneous cryptologic and writing manuals, even the use of the term *lettere mercantili* by the Venetian authorities suggest that in an amateur fashion, cryptology had become a mercantile custom in Venice.

Nevertheless, aside from amateur encoding by means of commercial jargon, sixteenth century Venetians were idiosyncratic in their development of a fully-fledged, state controlled and regulated professional cryptology department, housed in the Ducal palace, and tasked with the cryptography and cryptanalysis of sophisticated substitution ciphers. To this day, no systematic attempt has been made to investigate this process of professionalization of Venetian cryptology. Exploring it against the context in which it evolved is a long overdue task that might enable us to reconsider the distinctive course that professional cryptology took in sixteenth century Venice. Before proceeding to this exploration, a brief discussion of the historical development of professionalization is in order.

Professionalization in the Early Modern Era

Professionalization has been defined as the social process of organization of a trade or occupation, based on "cognitive specialization."[72] This is distinct from professionalism, a disciplinary device that "allows for control at a distance through the construction of 'appropriate' work identities and conducts."[73] In its fully developed form, professionalization has been analysed and discussed by scholars as an outcome of the industrial and urban demands of the nineteenth and twentieth centuries.[74] The lack of institutional frameworks – aside from the church or the university – within which professions developed in the early modern era can account for sociologists' attenuation of that period, when discussing professionalization.[75] Yet, as an emergent and dynamic phenomenon, professionalization – just like work organization and management – was developing long before linguistic terms were coined to describe it, borne out of the wider socio-political, intellectual, even religious context of the early modern period.[76]

In both qualitative and quantitative studies, sociologists and historians have produced a list of the key characteristics of a profession. These include a sense of commitment; an appeal to expertise; reliance on both theoretical knowledge and practical skills; a professional ethic; internal control and discipline; professional training and development; organization of work and, stemming from the latter, a certain degree of autonomy in the workplace and a perceived *esprit de corps*.[77] Particular emphasis amongst these characteristics has been cast on the "rise of a

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[72] Larson, *The Rise of Professionalism*, 3.
[73] Fournier, "The Appeal to 'Professionalism'," 281.
[74] Carr-Sanders, *Professions*; Larson, *The Rise of Professionalism*; O'Day, *The Professions*, 7.
[75] Biow, *Doctors*, 11
[76] O Day, *The Professions*, 14. See also, Malatesta, "Introduction," in *Society and the Professions*, ed. Malatesta.
[77] O' Day, *The Professions*, 4.

system of formal education" that "recognized and superseded apprenticeship."[78] It is important to emphasize here that while several of these traits can be traced back to some early modern professions, they stem, primarily, from nineteenth century professions, especially in the Anglosphere,[79] and are not entirely representative of professional traits in the preindustrial era.[80]

Studies on early modern professions have focused on two distinct categories: histories of individual professions – primarily the "learned" professions, such as the clergy and lawyers; and histories of societies with a focus on the learned professions.[81] Especially in the sixteenth and seventeenth centuries, the word "profession" was associated with a declaration of service – what someone professed to offer – rather a distinct form of work organization. Yet, as certain occupations gradually claimed knowledge, expertise, and monopoly, a tacit or more explicit discourse on what exactly was professed developed.[82] Sociologist Megali Larson identified two primary characteristics of early modern professions: their inextricable link to social stratification and a "liberal education" based on a combination of classical schooling and practical skills.[83]

More specifically, cognitive specialization was almost exclusively reserved for the literate elites upon whom specialists relied for their professional existence.[84] In this respect, the learned professions entailed establishment and social standing.[85] This trait was evident in the rise of the medical profession,[86] but also professions that rendered services to the state and the church, and that were predominantly performed by an educated "elite", as opposed to the mass of labourers. As we shall see, the Venetian cipher secretaries were themselves an "elite" of servile functionaries, emanating from the social class of the *cittadini* (citizens), the "secondary elite" in the Venetian social hierarchy,[87] placed immediately under the patriciate. The distinct characteristic of those educated "elites" was service and commitment to the state (or the church).[88] This was their *raison d'être* that complemented their need to make a living.[89]

The Professionalization of Cryptology in Sixteenth Century Venice

Compared to the composite yet disparate independent espionage networks that most European rulers relied upon for intelligence, Venice had created a centrally organized secret service. This

78 Larson, *The Rise of Professionalism*, 4.
79 O' Day, *The Professions*, 4.
80 Biow, *Doctors*, xii.
81 See O'Day, *The Professions*, 9-11, and bibliography therein.
82 Ibid., 13.
83 Ibid., 3.
84 Carr-Sanders, *Professions*.
85 O' Day, *The Professions*.
86 See Freidson, *Profession of Medicine*.
87 Chambers and Pullan, *Venice*, 261. On Venetian citizens, Grubb, "Elite Citizens," in *Venice Reconsidered*, eds. Martin and Romano; Bellavitis, *Identitè*.
88 O' Day called this underlying philosophy "Social Humanism, *The Professions*, 5
89 Ibid.

service was housed in the Ducal Palace, the headquarters of Venice's political, diplomatic, and intelligence activities, and was overseen by the Council of Ten, the exclusive committee responsible for state security.[90] As part of its covert operations, the Venetian secret service created a full-blown cryptology department that was responsible for the production of ciphers for the secret communication of Venetian authorities with overseas formal representatives, as well as the successful cryptanalysis of the ciphers produced by the chanceries of foreign rulers.

The seed for the gradual professionalization of the Venetian cryptologic service was sown by a single yet significant event, the appointment of Giovanni Soro as Venice's official cipher secretary in 1505.[91] Our knowledge of Soro is fragmented and primarily derives from the daily accounts of Marino Sanudo, the astute observer and chronicler of Venice in that period. According to Sanudo, Soro enjoyed a fine reputation as one of Italy's most accomplished cryptanalysts. His remarkable ability to break multilingual ciphers was so great that he enjoyed an unblemished reputation as an extraordinary professional code-maker and code-breaker.[92] So widely known was his eminence that even the Pope would frequently send him intercepted letters, in the conviction that only he could crack the codes in which they were written. Soro nearly always obliged.[93] It was most probably due to his numerous accomplishments that Alvise Borghi, his assistant and successor, called him "the father of this rarest of virtues."[94]

Giovanni Soro served the Venetian Republic for nearly 40 years, until his death in 1543.[95] During his career, he broke innumerable enemy ciphers for the Venetians, the Florentines, and the Papal Court, amongst others.[96] In 1539, he produced and presented to the Ten a cryptology instruction manual with sections in Italian, Spanish and French, that was deemed by Borghi to be more angelic than human in quality.[97] The Venetian authorities acknowledged his excellence by ensuring he was abundantly compensated for his services. As a result, they granted him several pay rises and other concessions throughout his career.[98] A year before he died, in 1542, the

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90 On the central organization of Venice's intelligence service, see Iordanou, "What News on the Rialto?" For an overview of early modern Venice's intelligence operations, see Preto, *I servizi segreti*.
91 On Soro, see Kahn, *The Codebreakers*, 109.
92 See, for instance, Sanudo, *I Diarii*, vol. 10, 231; Ibid, vol. 11, 393. On Venetian diarists and their use of correspondence, see Neerfeld, «*Historia per forma di diaria*»; Infelise, "From Merchants' Letters," in *Correspondence*, eds. Bethencourt and Egmond.
93 Sanudo, *I diarii*, vol. 10, 832; Ibid., vol. 38, 125; *Calendar of State Papers and Manuscripts Relating to English Affairs Existing in the Archives and Collections of Venice, and in Other Libraries of Northern Italy* (hereafter CSPVen), vol. 2, lxxi.
94 "… padre di questa rarissima virtù," ASV, CX, *Deliberazioni Secrete*, f. 7, n.d. (attributed to the year 1548).
95 Pasini, "Delle scritture," 302.
96 While it is not clear why Soro was allowed to serve other courts, it is probable that the Venetian authorities did not discourage him for diplomatic reasons.
97 Preto, *I servizi segreti*, 277.
98 Sanudo, *I diarii*, vol. 11, 232. See also, *Preto, I servizi segreti*, 141.

authorities assigned him two assistants.[99] From then on, the Ten kept a minimum of three permanent cipher secretaries on the payroll.

The professionalization of cryptology in sixteenth century Venice was an emergent, dynamic, and gradual process that comprised the formal appointment of Soro's assistants. Thereafter, a line of eminent cryptologists found themselves in the employ of the Council of Ten, working in the *secreto* (the Venetian Black Chamber) on the top floor of Venice's Ducal Palace. Their work was conducted under strict laws of secrecy, the breach of which was subject to legal sanctions, including the death penalty.[100] When he died, Soro was succeeded by four cipher secretaries: Alvise Borghi, Giambattista de Ludovici, an engineer named Giovanni, and Zuan Francesco Marin,[101] who was already working as a state secretary when he was chosen to join the team of *cifristi* in 1544.[102]

Zuan Francesco Marin was the most distinguished of the four recruits. His ascent to eminence commenced when he succeeded in cracking an extremely complex Spanish code.[103] During his thirty-year career, he gradually rose from the ranks of *secretario straordinario* (extraordinary secretary), the entry level position in a Venetian bureaucrat's career, to a secretary of the Council of Ten.[104] This was the second highest ranking position in the hierarchy of the Venetian Ducal Chancery, after the post of *Cancellier Grande*, the great chancellor. The latter was the most important office open to members of the *cittadini* class, who could never aspire to prohibitively high posts reserved for patricians, such as the position of the Doge.[105] Marin occupied the post of *cifrista* for nearly thirty years, during which he made a name for himself as one of Venice's most distinguished cryptanalysts, breaking countless ciphers in different languages, and helping to forestall several state threats.[106]

Professional training and development

In the early 1570's, Venice suffered a heavy blow by losing Cyprus, one of her most prized strongholds in the Mediterranean, to the Ottomans, following earlier heavy losses of its territories in the Peloponnese.[107] Moreover, between 1575 and 1577 a devastating plague deprived the city of one quarter to one third of its population.[108] In consequence, most probably

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99 Kahn, *The Codebreakers*, 109.
100 See, for instance, ASV, CX, *Deliberazioni Secrete*, Reg. 11, c. 158r.-158v. (23 May 1578).
101 CSPVen, vol. 2, lxxi.
102 Biblioteca Nazionale Marciana (BNM), Manoscritti Italiani (Mss. It.) Classe (cl.) VII 1667 (8459), *Tabele nominative e chronologiche dei Segretari della Cancelleria Ducale*, folio (fol.) 6r.
103 CSPVen, vol. 2, lxxi.
104 BNM, Mss. It. cl. VII 1667 (8459), fol. 6r.
105 On the *Cancellier Grande*, see, Trebbi, "La cancelleria veneta."
106 ASV, CX, *Deliberazioni Secrete*, Reg. 11, c. 90v. (21 Mar 1576).
107 Knapton, "Tra dominante e dominio," in *La Republica*, eds. Cozzi, Knapton, and Scarabello, 222-223.
108 On the 1575-77 plague in Venice, see Preto, *Peste e* società. On a re-evaluation on the impact of the plague on the Venetian society and economy, see Iordanou, "Pestilence."

for contingency purposes, the Ten deemed it necessary to train and develop their professional cryptologists. By that point, the Venetian cryptology service that had been in operation for nearly three decades had reached a state of maturation that allowed it to display distinct professionalization traits, such as specialist skills formation through systematic training. For this reason, the Ten named Zuan Francesco Marin, their most eminent cryptologist, as the new recruits' trainer, due to his natural aptitude to cryptology and his tireless study of the subject.[109] Marin, therefore, became the first known formal trainer in the Venetian school of professional cryptology, an in-house training and development regime for novice professional cryptologists. His appointment and consequent service as the school's official instructor categorically refutes contemporary scholarly contentions that no systematic "in-door" training and development for state cryptologists existed prior to the eighteenth century.[110] Moreover, it broadens and deepens current debates in business history that portray systemised training and professional skills formation as a nineteenth century phenomenon.[111]

As they were practically the custodians of the state's most private secrets, the Venetian cipher secretaries underwent a rigorous programme of training and development. This started with an entrance examination aimed at determining their aptitude to codebreaking. Passing the examination, the novice cipher secretaries would receive instruction in Latin and other languages that were vital for the cryptologist's trade, rhetoric, grammar and calligraphy. Importantly, they were expected to study the works of the forefathers of cryptology, including those of Alberti, Trithemius, and Giambattista Della Porta.[112] The completion of their probation was confirmed after they had passed a final, more rigorous examination, in which they were expected to break a complex cipher without a key.[113] This achievement also entailed a salary increase from four to a maximum of ten ducts monthly.[114] The Ten emphasized that training was vital, as the end goal was not simply the ability to encipher, decipher, and break unknown codes but the cultivation of deep theoretical and practical knowledge of the *scientia* of cryptology.[115]

Zuan Francesco Marin did not live long enough to complete his job of training the next generation of Venetian cryptologists. He died in 1578, leaving the authorities at a loss as to how they could fill this intellectual and professional vacuum, since most of his trainees were too inexperienced to take up his role.[116] Given the lack of a suitable replacement, the Ten deliberated

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109 ASV, CX, *Deliberazioni Secrete*, Reg. 11, cc. 77v.-78r. (25 Jan. 1576).
110 Strasser, *Lingua Universalis*, 66, 249.
111 Larson, *The Rise of Professionalism*; Thelen, "Skill Formation," in *The Oxford Handbook*, eds. Jones and Zeitlin.
112 Preto, *I servizi segreti*, 271.
113 ASV, CX, *Deliberazioni Secrete*, Reg. 11, cc. 77 v.-78 v. (25 Jan. 1576)
114 ASV, CX, *Deliberazioni Secrete*, Reg, 14, c. 127 r.-v. (31 Aug. 1605); ASV, CX, *Deliberazioni Secrete*, Reg. 15, cc. 16 v.-17 r. (24 Oct. 1607).
115 ASV, CX, *Deliberazioni Secrete*, Reg. 19, c. 18 r.-v. (14 July 1636).
116 ASV, CX, *Deliberazioni Secrete*, Reg. 11, c. 158 r.-v. (23 May 1578).

that what Marin was able to teach orally (*con la sua voce*) while still in life, he could do so through his writings (*con la sua scrittura*) posthumously. For this reason, the Heads of the Ten ordered that Marin's voluminous writings were consigned to the state, indexed, and deposited in a separate casket within their office, hermetically sealed with a key to be kept by the Ten. The documents would be made available for consultation to the novice cipher secretaries, who were instructed to pay particular attention to the scriptures relating to breaking ciphers. The *cifristi* were granted permission to make copies of Marin's documents in order to study them at their leisure at home. Failure to keep these copies confidential entailed severe sanctions, including the death penalty. For this reason, the *cifristi* were to maintain an inventory of their copies, to be stored in a designated casket where all relevant state ciphers were kept.[117]

This autodidactic mode of training and professional development was deemed sufficient for Zuan Francesco Marin's team of cryptologists. But when, twenty years later, a fresh intake of recruits entered the Venetian cryptology department, a new instructor was sought.[118] This was found in another eminent Venetian cryptologist, Girolamo Franceschi, who had initially been recruited as a prodigy, due to an innovative cipher that he had invented, which was deemed impossible to crack without a key.[119] In 1596, twenty years into his service, Franceschi was appointed to the role of the trainer of the next generation of Venetian cryptologists. Amongst his nominated trainees was Piero Amadi, a state secretary who had displayed a natural adeptness at ciphers.[120] Piero was the son of Agostino Amadi, a Venetian citizen who, in 1588, wrote a detailed cryptology manual entitled *Delle Ziffre* (On Ciphers). *Delle Ziffre*, which still survives in the Venetian State Archives,[121] is emblematic of the intellectual superiority of Venetian cryptologists. In it, Amadi presented a myriad of ways for the production of ciphers in any language imaginable, including Greek, Arabic, Latin, and even the language of the devil, for which he provided practical examples.[122] In his work he also detailed numerous deciphering techniques and several recipes for the production of invisible ink. After his death, his wife consigned the manuscript to the Ten, who were so impressed with its level of erudition that they decided to adopt it as a training manual for their cryptologists, "so that our young secretaries, who wish to be employed in such a noble profession in our service, can be instructed and

117 Ibid.
118 Extant documents do not reveal why it took two decades to find a new trainer. From a chronological perspective, the latter was appointed concurrently with the intake of new recruits. From this we can hypothesize that Marin's initial and posthumous training regime was deemed sufficient for his cohort of trainees but inadequate for the new entrants to the service. It is evident that the trainer was internally recruited, since it took two decades to develop the next cryptology instructor.
119 Ibid., c. 87 r. (29 Feb. 1576).
120 ASV, CX, *Deliberazioni Secrete*, Reg. 14, c. 7r.-v. (9 Sep. 1596).
121 ASV, *Inquisitori di Stato*, b. 1269.
122 Ibid., , c. 35 v.

trained."[123] The delicate and critical nature of the book's content is most probably the reason why it never found its way into print.

In compensation for his work, the Ten offered Amadi's two sons two concessions: a monthly pension of ten ducats for life, to recompense for the poverty in which the family had been reduced after the *pater familias*'s death;[124] and the opportunity for employment in the Venetian chancery upon completion of their fifteenth year of age, when a vacancy would be made available. It was also deliberated that the two sons would not sit the customary entrance examination that aspiring Senate secretaries were subjected to. Instead, they would have to undergo the specialist entrance examination intended for aspiring cipher secretaries, in the hope that at least one of them would have inherited their father's natural aptitude to ciphers.[125]

This approach to the selection and recruitment of new *cifristi* denotes a rigid preference towards inter-generational favouritism, that is, reserving specific state secretary positions for the members of the family of already instated bureaucrats. This was an ordinary approach to recruitment employed by the Council of Ten and the Great Chancellor, who oversaw recruitment and internal promotions in the Venetian chancery.[126]

Recruitment and promotions: Inter-generational favouritism and professional isolationism

Just like several other services of state bureaucracy in Venice, the profession of the *cifrista* was a family business, passed on from father to son, grand-son or nephew. The case of Zuan Francesco Marin was emblematic of this hereditary practice. When, in the late 1570's, the Ten deliberated that Marin was to train the next generation of state cryptologists, they offered him the opportunity to name two of the three new recruits. In response, Marin nominated his son Ferigo and his nephew Alvise.[127] The Ten granted Marin the right to nominate family members due to his unmatched proficiency in code-breaking. In essence, they hoped that Marin's descendants might have inherited his natural talent and insatiable appetite for the study of cryptology.

More specifically, the Ten knew that Ferigo, Marin's youngest son, had learnt the traits of the trade almost by osmosis, having displayed glimpses of his father's impressive "natural inclination" (*natural inclinatione*) to cryptology from early own. In consequence, they deliberated that he was the ideal candidate for the post of the trainee *cifrista*. Accordingly, Ferigo was fast-tracked to the formal entry-level position of an extraordinary secretary without having

123 "[...] *si possono andar instruendo et allevando i gioveni della cancelleria nostra che vorrano impiegarsi in profession cosi' nobile per il nostro servitio*."ASV, CX, *Deliberazioni Secrete*, Reg. 13, cc. 48r.-49 r. (10 March 1588).
124 ASV, CX, *Deliberazioni Secrete*, Reg. 13, c. 49r.-v. (16 March 1588).
125 Ibid.
126 De Vivo, "Cœur de l'Etat."
127 ASV, CX, *Deliberazioni Secrete*, Reg. 11, cc. 77v.-78r. (25 Jan. 1576).

to sit the customary entrance examination.[128] He was to serve in this capacity until the age of twenty, when he would be promoted to the next level in the Venetian civil service hierarchy, that of an ordinary secretary (*secretario ordinario*). Five years after that promotion, granted that he passed the formal examination of breaking an unknown cipher without a key, he would ascend to the respectable position of a secretary of the Senate or of the Collegio.[129]

While Ferigo was accelerated to the post of trainee cipher secretary, his cousin Alvise Marin had to wait for a year to be appointed.[130] This is because, while the Ten would frequently headhunt individuals recommended to them, there had to be an opening for a position, usually ensuing from the death of an employee. Hence Alvise Marin's one year wait for a chancery vacancy.[131] Once they made it into the system, the progression of both young men, as indeed most novice recruits in the chancery, was steady but gradual. At the age of twenty Ferigo assumed the role of *secretario ordinario*, which at that point was left vacant due to the death of his brother, another Alvise.[132] Several years after their appointment, and having long completed their formal induction to the post of cipher secretary, both men assumed high level civil service posts, Ferigo as Secretary of the Senate and Alvise as an ordinary secretary, having passed the examination of breaking a polyalphabetic cipher without a key.[133]

Zuan Francesco Marin, his son Ferigo, and his nephew Alvise were not the only members of the Marin family to have secured positions in the Venetian chancery. As family trees and organizational charts of Venetian secretaries stored in the archives of St Mark's Library in Venice reveal, the Marin family had an established foothold in the Venetian chancery for generations. This inter-generational employment trend started with the recruitment of Marin's father, Alvise Marin de Zuane, the founder of the Marin family, as a *secretario extraordinario* in 1497.[134] Alvise's brother also served the Venetian chancery as a state secretary between 1498 and 1515.[135] Alvise's sons, in turn, secured jobs in the Venetian state bureaucracy, as well. While his youngest son Ferigo only managed to reach the first rank of *secretario extraordinario* in 1544,[136] his eldest son, Zuan Francesco Marin, enjoyed a long and successful career as one of the state's most eminent cryptologists, and eventually assumed the highest ranking state secretary position, that of secretary of the Council of Ten.[137] Zuan Francesco Marin managed to

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128 Ibid.
129 Ibid.
130 Ibid., c. 117v. (8 Jan. 1577).
131 Ibid., cc. 117v.-118r. (8 Jan. 1577).
132 Ibid., cc. 142r.-v. (23 Sep. 1577). See also BNM, Mss. It. cl. VII 1667 (8459), fol. 8r.-v.
133 ASV, *Deliberazioni Secrete*, Reg. 13, cc. 61 v.-62 r. (22 Aug. 1589); Ibid., c. 81 r.-v. (29 Nov. 1590); Ibid., c. 82 r.-v. (23 January 1591).
134 BNM, Mss. It. cl. VII 1667 (8459), fol. 4v.
135 Ibid.
136 Ibid., fol. 6v.
137 Ibid., fol. 6r.

secure state service positions for his three sons, Alvise, Zuane, and, as we have seen, Ferigo, whom Zuan Francesco trained as a *cifrista*. Due to his success, Ferigo was also allowed to induct his own two sons, Zuan Francesco and Antonio, into the Venetian chancery as state secretaries.[138] Overall, numerous descendants of the Marin family would occupy the posts of state secretary or cipher secretary for generations.[139]

This inter-generational favouritism was not uncommon in the Venetian chancery.[140] It was, however, particularly pronounced in Venice's cryptologic service, that was characterized by professional isolationism. Several reasons have been postulated by scholars to account for this tendency. The historian Filippo de Vivo offered two plausible explanations. The first is purely financial. At a time when the Republic's finances were depleted by continuous wars and the secretaries' salaries could not always be paid in full, the safeguarding of secretarial posts for family members was a means of compensation and staff retention.[141] The second reason is socio-political. Nearly all state secretaries in Venice were recruited from the social class of the citizens, who did not have political rights. To compensate for this, but importantly, to secure their loyalty, the government reserved exclusive privileges for them, including civil service posts.[142] In a similar vein, Emrah Safa Gürkan argued that the Ten saw it as incumbent upon themselves to provide for the family of deceased civil servants, hoping that their descendants would have inherited their skills and talents.[143] Inter-generational favouritism, then, was linked to loyalty, skills, and knowledge transfer.

While these soundly argued contentions are plausible and merit serious consideration, another explanation for this recruitment pattern ensues, if we consider the significance of secrecy for such a specialist domain, and secrecy's instrumentality in professional identity construction.[144] Historically, secrecy has been considered amongst the primary functional responsibilities of secretaries. It is not accidental that well into the eighteenth century *secret*aries were believed to be by definition keepers of secrets.[145] Several scholars, erstwhile and contemporary, have taken for granted the secrecy secretaries were bound by. Francesco Sansovino, for instance, the versatile scholar and eulogist of Renaissance Venice, described secretaries as those who "have eyes and mind, but not a tongue outside of counsel."[146] Historian

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138 Ibid, fols. 4v.-10r. See, also, Gürkan, "Espionage," 179-180.
139 Ibid., fols. 10r.-12v.; Preto, *I servizi segreti*, 276.
140 The bibliography on the secretaries of the Venetian chancery is vast. See, amongst others, Trebbi, "La cancelleria;" Trebbi, "Il segretario;" Zannini, *Burorocrazia*; Galtarossa, *Mandarini veneziani*.
141 De Vivo, "Cœur de l'Etat," 720-722.
142 De Vivo, *Information*, 51, fn. 31.
143 Gürkan, "Espionage," 180.
144 Simmel, "The Sociology."
145 See Biow, *Doctors*, esp. Chapter 6 for relevant bibliography.
146 Sansovino, *L' avvocato*, 152.

Douglas Biow called them "deferential, tight-lipped servants."[147] Few scholars, however, have endeavoured to explain why and how secrecy was linked to secretaries' development of professional identity.

To explore this consideration further, some established social theorizations of secrecy must be brought into the discussion. Secrecy, as a process, enables the creation of the boundary between two separate entities, *those in the know* and the *ignorant others*. The exclusivity of being *in the know*, compared to the *ignorant others*, can boost the sense of distinctive inclusiveness in a group and, by extension, cement one's identification with it.[148] Additionally, the social aspect of secrecy, that requires and promotes the conscious awareness of the group, due to the intention of concealment and boundary construction, can enhance the process of group identity creation. The sense of belonging that ensues – the feeling of "'specialness' in being a lifelong member of a privileged inner circle," as intelligence scholar Michael Herman describes it[149] – can potentially augment the need to protect and perpetuate secrecy, so as to maintain the group. Secrecy, therefore, creates a dynamic relationship between its agents and becomes both the condition and the consequence of the formation of group identity.[150] By singling out these professionals as the custodians of state secrets and reinforcing the distinctive significance of their work with exclusive benefits, the government can be seen as engineering the social construction of a professional identity that was premised on secrecy.[151] In essence, by reserving specific privileges such as civil service posts for these secretaries and their families in exchange for their secrecy, the authorities managed to maintain their loyalty and continuous service; indeed, there is no known case of betrayal of secrecy on the part of any Venetian cipher secretary who was privy to what nowadays would be termed "classified" information. This is indicative of an emergent professional ethos. In this respect, secrecy created an on-going relationship between state secretaries and the authorities and became both the condition and the consequence of professional identity formation and, by extension, loyalty.[152]

Corporate control and state regulation

By the time Ferigo Marin and Girolamo Franceschi had taken the reins of the Venetian cryptology department, the discipline's professionalization had reached a state of maturation that rendered it a stand-alone professional service, controlled and regulated by the authorities. In the late 1590s, the Ten even proposed the election of a committee of five delegates – all noblemen with hereditary rights to statecraft – who were responsible for overseeing and making strategic

147 Biow, *Doctors*, 22.
148 See Simmel, "The Sociology", 497.
149 Herman, *Intelligence Power*.
150 Costas and Grey, "Bringing Secrecy;" Costas and Grey, *Secrecy at Work*.
151 Simmel, "The Sociology."
152 Costas and Grey, "Bringing Secrecy;" Costas and Grey, *Secrecy at Work*.

decisions on the state's cipher policies. This included selecting the most effective cipher to be used by the Venetian authorities and their diplomats.[153] The role of the five-member committee was particularly relevant when disagreements arose, especially with regard to the quality of in-house produced ciphers, in which case they were asked to settle disputes and restore order.[154]

On the eve of the seventeenth century, the regulation of the Venetian cryptology service became even more stringent. In 1605, for example, it came to the Ten's attention that several of the older cipher keys had gone missing and even ended up in the wrong hands. Accordingly, both Ferigo Marin and Piero Amadi were summoned to a formal audience with the Heads of the Ten, and ordered to set aside all cipher keys already used, and produce new ones that were to be distributed to all state envoys. The Ten also deliberated that, for purposes of secrecy and security, older keys no longer in use ought to be burnt from time to time. Importantly, Marin and Amadi were instructed to create two books – one for the Venetian strongholds in the Mediterranean and one for the Venetian colonies in the Italian mainland – in which they would clearly register all ciphers and their keys, taking a note of the date and the person to which they had been consigned, and the expected return date. Copies of these volumes were to be stored in secret locations. The *cifristi* were also required to work with their doors hermetically closed and failure to abide by this rule would result in the forfeit of one year's salary.[155]

In the meantime, as Ferigo Marin's health was deteriorating rapidly and none of the current secretaries had produced sons who were inherently gifted in the art of cryptology, the *Cancellier Grande* was ordered to recruit two more cipher secretaries under the pupillage and mentorship of Franceschi and Amadi. Their monthly salary was set at four ducats, to be increased to eight or even ten ducats upon completion of their two year probation. Indeed, in November of that year two young secretaries were appointed, Giambattista Lionello and Ottavio Medici. When, after two years of apprenticeship, they passed the exam of breaking a cipher without a key, their salary increased to ten ducats monthly.[156] And so, the Venetian cryptology service continued to train and develop Venice's professional cryptologists until the fall of the Republic, routinely reserving this precious post for fathers and sons who demonstrated the ability to carry on the *scientia di cavar le cifre* (the science of breaking codes) in a hereditary manner.[157]

It is important to emphasize at this stage that, by trying to restore the picture of early modern Venice's professional cryptology service, I do not intend to suggest Venice's superiority

153 See, for instance, ASV, CX, *Deliberazioni Secrete*, Reg. 13, cc. 92v.-93r. (16 March 1592).
154 For an example, see ASV, *Deliberazioni Secrete*, Reg. 14, c. 8r. (16 Sept. 1596).
155 Ibid., cc. 126r.- 127r. (31 Aug. 1605).
156 Ibid., c. 127r.-v. (31 Aug. 1605); ASV, *Deliberazioni Secrete*, Reg. 15, cc. 16v.-17r. (24 Oct. 1607).
157 *Pasini,* "Delle scritture," *309; Preto, I servizi segreti,* 225.

compared to other early modern states.[158] While Venice's precocity in the systematic development of ciphers is generally acknowledged in the literature,[159] my primary intention has been to shed light, not on the deft operation of ciphers by professionals as such, but on the development of a distinct, stand-alone profession of cryptology, as it emerged and evolved in the Doge's Palace, the Venetian state's political nucleus. Future scholarship might expose and analyse the professionalization of cryptology in other early modern Italian and European states, where codes and ciphers were produced and broken by professional *cifristi*.[160]

Final Reflections on Professionalization

The sixteenth century saw a gradual proliferation of professions primarily due to the urbanization of Italian city states that increased the demand for professional expertise.[161] Yet, the term *professione*, as used in the early modern period is, to this day, a challenging one to define.[162] According to Baldassare Castiglione's *Il libro del Cortegiano* (1528), *professione* meant, among other things, "intellectual labor within a culturally defined discipline, such as priesthood or the law," as well as "the product of any practice that required master-pupil training."[163] In short, it was a "polysemic" term, denoting professing one's faith, ideas, or doctrines; or an intellectual or manual occupation.[164] By the time Tommaso Garzoni (1549-1589) published his famous treatise on "all professions of the world,"[165] a distinct "professional mentalité" was giving rise to a whole host of claims around professional identity and expertise.[166]

In relation to the professional *cifrista*, one could argue that his role was nothing more than a mere subdivision of the established profession of the secretary,[167] which entailed, not only the routine tasks of writing, copying, and cataloguing documents, but, importantly, the "learned rhetorical expertise" of performing such tasks.[168] However, according to Andrew Abbott's structural and relational theory of professions, a specific body of work delegated by a profession to a subordinate group can generate a new profession. This can happen as the newly delegated

158 Dejanira Couto mentions the existence of at least another trainer of *cifristi* in the sixteenth century, which indicates the professionalization of cryptology in other Italian states, but does not substantiate her claim with any archival or historiographical references. Couto, "Spying," in *Correspondence*, eds. Bethencourt and Egmond, 289.
159 See, for example, Villain-Gandossi, "Les dépêches chiffrées; Kahn, *The Codebreakers*; Preto, *I servizi segreti*; Couto, "Spying," in *Correspondence*, eds. Bethencourt and Egmond.
160 An excellent new volume that addresses the use and dissemination of cryptography in early modern Europe has recently been edited by Rous and Muslow, eds., *Geheime Post*.
161 Biow, *On the Importance*, 39.
162 Abbott, *The System of Professions*, 318.
163 Biow, *Doctors*, 7.
164 Malatesta, "Introduction," in *Society and the Professions*, ed. Malatesta; Biow, *Doctors*, 5-6.
165 Garzoni's *La piazza universale* was first published in Venice in 1586.
166 McClure "The *Artes* and the *Ars moriendi*," 95, 121.
167 In his list of established professions, Tommaso Garzoni discusses *cifranti* (not cifristi) within the broader category of professional writers and scribes. Instead, *cifristi* are better suited to Garzoni's description of "Consiglieri, e Secretarii." See Garzoni, *La piazza universale*, 182, 174.
168 Biow, *Doctors*, 4.

body of work embraces novel technical and intellectual developments in order to generate new knowledge.[169] This is particularly applicable to the profession of the *cifrista*, whose expert knowledge and deftness of ciphers, contingent upon specialist education and training, extended beyond the customary intellectual errands of the professional secretary.

Let us explore this proposition further. In the late 1540s, in his fervent petition to the Venetian government for a promotion to the profession of *cifrista*, the Venetian state secretary Alvise Borghi claimed that, while in other domains of intellectual activity the Ancients by far surpassed contemporaries, the art of cryptology was an exception to this rule. This was because, while several ingenious minds could invent secret ways of writing, the complexity of professional cryptology meant that the employ of Princes was accessible to only a few genuine professionals.[170] For the Council of Ten, what separated the amateurs from the genuine professionals was specialist skills formation by means of continuous professional training, which was the prerequisite for employment when they sought individuals to enter the service as professional *cifristi*; not talent. Talent and aptitude to cryptology were taken as a given. That was the case for Ferigo Marin, who was expected to study under his father, and to continue to upskill himself even after his second promotion to an ordinary secretary;[171] similar was the case for Piero Amadi, who was instructed by Girolamo Franceschi,[172] as well as Giambattista Lionello and Ottavio Medici, who were, in turn, trained by both Franceschi and Amadi.[173] In other words, a common educational process, combined with a shared professional identity, even an emerging professional ethos and philosophy led to the development of a distinct, stand-alone profession of cryptology in sixteenth century Venice.[174]

While these distinct traits of a sixteenth century profession are redolent of several of the criteria that contemporary sociologists have postulated as key determinants for "modern" professions, in my analysis I have intentionally refrained from examining the profession of the *cifrista* against every single one of them. This is because the principles determining professions and professionalization in the early modern period are "distinctly at odds with modern sociological criteria."[175] Undeniably, some of these principles – such as appeal to expertise, work organization, and internal discipline – are emergent in the early modern period. In our historical reconstruction of early modern professions, however, we should not ignore the significance of "a communal, self-authenticating discourse that both periodically defined and policed […] notion[s]

169 Abbott, *The System of Professions*.
170 ASV, CX, *Deliberazioni Secrete*, f. 7, n.d. (attributed by the archivist to the year 1548).
171 ASV, CX, *Deliberazioni Secrete*, Reg. 11, c. 45v. (25 Jan 1576); Ibid., Reg. 13, cc. 61v.-62r. (22 Aug. 1589).
172 ASV, CX, *Deliberazioni Secrete*, Reg. 14, c. 7r.-v (9 July 1596).
173 ASV, CX, *Deliberazioni Secrete*, Reg. 15, cc. 16v.-17r. (24 Oct. 1607).
174 On education, ethos, and professional philosophy as key characteristics of early modern professions, see O'Day, *The Professions*.
175 Biow, *Doctors*, xii.

of a particular profession as a meaningful form of work."[176] In absence of documented self-narratives of *cifristi* about their sense of professional identity and expertise, Alvise Borghi's notion of the profession of the *cifrista*, echoing the meaning ascribed to it by the very institution that marshalled it into existence, the Council of Ten, offers such a discourse.

Conclusion

Resembling the closed caste oligarchical structure of the Venetian government, Venice's professional cryptology service blossomed within an interdependent system of inter-generational favouritism and professional isolationism. Both these attributes served to promote specialist skills formation and familial specialization, with the purpose of safeguarding secrecy and the construction of a distinct professional identity, even an incipient professional ethos and philosophy. Moreover, Venice's professional cryptology department flourished alongside a wider diffusion of an amateur use of ciphers amongst a variety of members of the Venetian society, including merchants. Was there a link between the two?

It is unquestionable that the professional use of ciphers in Venice proliferated in the wider landscape of the systemization of diplomatic activities in the late medieval and early modern period.[177] From this perspective, there seems to be no direct link between the amateur use of codes and ciphers, especially as it had been instigated by merchants in the form of merchant-style codes, and the professional use of cryptology by "professionals of oral and written communication" that were involved in public administration.[178] A closer look at the users of Venice's cryptology service, however, might tell a different story.

Trade and industry, the cornerstones of the Venetian economy throughout the centuries, had traditionally been premised on secrecy and efficient intelligence.[179] Accordingly, Venetian merchants were expected to be competent in secret communication, even if the latter was achieved through simple means of encryption. The idiosyncrasy of Venetian merchants hinged on the fact that the very individuals that came up with such basic techniques of concealing information to protect commercial interests, such as Andrea Barbarigo, emanated from the Venetian patriciate, the highest order in the Venetian social hierarchy that comprised the Venetian ruling class. As such, Venetian patricians had their feet firmly planted in two overlapping worlds: those of trade and politics.[180] It is possible, therefore, that the patricians who

176 Ibid., 12.
177 Lazzarini, *Communication*; Lazzarini, "Renaissance Diplomacy," in *The Italian Renaissance State*, eds. Gamberini and Lazzarini; Senatore, "*Uno Mundo de Carta*."
178 Lazzarini, *Communication*, 115, 202.
179 See, for example, Juárez Valero, *Venecia*.
180 On the patricians in early modern Venice, see Romano, *Patricians and Popolani*.

prompted the professionalization of cryptology within the Doge's palace were the ones who had been schooled in a tradition of concealing trade secrets through simple "mercantile letters."

While historiography to date has not furnished firm evidence for this hypothesis to ripen into certainty, this peculiarity of the Venetian ruling class, that accounts for the enmeshment of trade, politics, and diplomacy in early modern Venice, can suggest that the professionalization of cryptology in Venice could have been influenced, in a way, by this mercantile custom. If anything, it is not accidental that this professionalization process intensified between the 1540s and 1570s, when the Venetians were fighting – both through warfare and diplomacy – to protect some of their most prized commercial strongholds in the Levant, such as parts of the Morea and the island of Cyprus.[181] In this respect, while I do not wish to argue that the Venetian *homo oeconomicus*, to use Frederic Lane's term,[182] directly interfered with the professionalization of cryptology in Venice, mercantile customs, in combination with sixteenth century political and economic value judgements, may have influenced its gradual proliferation. Accordingly, scholars could pursue two future research avenues: firstly, the direct or indirect role of early modern merchants in the diplomatic or political dealings of governments;[183] and secondly, the hitherto neglected professional development of clandestine practices as a distinct function of state bureaucracies in order to protect economic, aside from political, interests.

With these thoughts in mind, one final question remains. What can the historical reconstruction and exploration of the professional cryptology service of early modern Venice confer to the historical study of management, organization, and business practices? Firstly, the study of the systematic proliferation of the amateur use of ciphers by traders and merchants, both for commercial and diplomatic purposes, can offer significant insights into an aspect of medieval and early modern commercial activity that still remains largely unexplored and, thus, awaits scholarly attention.[184] Secondly, this case study demonstrates that traditional professional practices that are associated with business and management, such as specialist skills training and specialization, professional identity formation, and regulation came to assume their form in unforeseen places, not only in Medieval and Renaissance marketplaces and early modern state monopolies of overseas trade, but in burgeoning state bureaucracies, as well. Viewed from this perspective, the remit of case studies that the medieval and early modern period can confer to the disciplines of business and organizational history could potentially broaden, to include managerial and business practices within state administration, in addition to more conventional

181 See Arbel, "Venice's Maritime Empire," in *Companion*, ed. Dursteler.
182 Lane, *Andrea Barbarigo*, 5.
183 For post-industrial societies, Chernow, *The House of Morgan*; Hart, "Red, White, and 'Big Blue';" Sawyer, "Manufacturing Germans."
184 Lazzarini, *Communication*, 39-41.

studies on, for instance, early modern accounting.[185] In short, casting our scholarly gaze to the early modern era will enable us to uncover a slender yet significant aspect of business and organizational history that traces the origins of business and organizations in unlikely places, such as churches, monasteries, agricultural estates and, of course, governments.[186]

[185] See, for example, Lane, "Venture Accounting;" Goldthwaite, "The Practice."
[186] For examples, see Ruef and Harness, "Agrarian Origins;" Kieser, "From Asceticism to Administration;" Ezzamel, "Work Organization."

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