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Workshop as Network: A Case Study from Mughal South Asia

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Workshop as Network:
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Abstract

Over the course of Emperor Akbar's long reign (1556–1605), more than one hundred manuscript painters found employ at the Mughal court. The overwhelming majority of these artists worked in a collaborative capacity. This study uses Social Network Analysis and Digital Humanities methods to analyze the patterns of artistic collaboration and learning across several manuscript projects of the later sixteenth century. Among the conclusions advanced is that the structure of manuscript illustration project teams, which fostered a large number of acquaintanceships among many artists, facilitated the widespread transmission of diverse practices, thereby contributing to the production of a new, synthetic style.

Résumé

Au cours du long règne de l'empereur Akbar (1556-1605), plus d'une centaine de peintres de manuscrits furent employés à la cour du Moghol. La grande majorité des artistes concernés travaillaient de manière collaborative. Partant d'une analyse de réseau et de méthodes numériques, cette étude vise à mieux comprendre les modalités de collaboration artistique et d'apprentissage, à partir de plusieurs projets de manuscrits de la fin du XVIe siècle. Parmi les conclusions avancées, l'étude de la structure des équipes d'illustrateurs de manuscrits révèle de nombreuses connaissances mutuelles entre artistes. Ces relations semblent avoir facilité la transmission large des pratiques, et contribué ainsi à la production d'un style nouveau, un style synthétique.

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Over the course of his long reign, the Mughal ruler Akbar (r. 1556–1605) expanded the core of the empire, comprising much of the Ganges-Yamuna Doab, to include central India, most of Rajasthan, Gujarat, Bengal, northwestern India, and the northern Deccan. The mushrooming imperial apparatus necessitated the employment of countless soldiers, administrators, and other bureaucrats, but craft and design specialists were much in demand, too, as the need for supplies, gifts, and other commodities remained ever acute. Major construction projects at Delhi, Agra, Fatehpur Sikri, and Lahore required a surfeit of architects, masons, gardeners, and other laborers, while countless designers and weavers addressed the often mobile Mughal court's ballooning urgency for tents, canopies, carpets, floor spreads, banners, and clothing of various kinds.[1] Teams of skilled workers were also essential to the daily operations of the royal mints, armories, and manuscript workshops. Akbar's conquests facilitated the incorporation of numerous South Asian artisans into the imperial bureaucracy, but the prospect of gainful employment and premium salaries also attracted calligraphers, architects, painters, designers, and craftsmen from Iran, Central Asia, and even Europe. The Mughal labor force thus not only grew in size but also diversified in terms of experience, skill, and linguistic and cultural knowledge.

While these points are widely known, precisely *how* artisans and others operated in the royal workshop (*karkhana*) is less well understood.[2] The *A'in-i Akbari* (Institutions of Akbar)—an official record of the Mughal administration completed around 1596–7 by the emperor's close friend and vizier Abu'l Fazl (d. 1602)—contains important information about the various courtly workshops and manufactories. It reveals, for example, that these institutions were great in number and, by virtue of their mention in this text, were integral to the author's presentation of the regime as an expansive bureaucratic machine, which the emperor finely tuned.[3] The *A'in-i Akbari* provides the salaries, ranks, and responsibilities of a range of workshop positions, and even goes so far as to identify select workshop servants by name, but it is otherwise silent with regards to general operating procedures. How, for example, did large groups of artisans collaborate in state-controlled *karkhana*s? Were workshops structured around family, ethnic, or sectarian affiliations? And how did specialists transmit knowledge among each other? The whereabouts of the various sixteenth-century Mughal workshops also remain in question. According to the contemporaneous commentary of Father António de Monserrate (1536–1600), who accompanied the first Jesuit mission to the Mughal court in 1580–1, the ateliers for the "finer and more reputable arts" (including for painting, goldsmithing, and weaving, among others) were located in proximity to Akbar's palace city of Fatehpur Sikri, but where exactly these facilities were situated, how these spaces looked, and in what fashion they were used is unknown.[4]

Given the limitations of textual sources like these, further investigation into the *karkhana* system under Akbar might seem futile. Art historians, however, have made excellent use of the copious evidence of illustrated manuscripts and album pages to better understand how royal painters in the *kitabkhana* (manuscript workshop, lit. "book-house") carried out their tasks. John Seyller, for example, has identified numerous inscriptions on or near manuscript paintings that provide

[1] On the mobility of the Mughal court see Carla M. Sinopoli, "Monumentality and Mobility in Mughal Capitals," *Asian Perspectives* 33, no. 2 (1994): 293–308. For studies on the architecture and carpets of the Mughal Empire see Ebba Koch, *Mughal Architecture: An Outline of Its History and Development* (1526-1858) (Munich: Prestel-Verlag, 1991); Catherine B. Asher, *Architecture of Mughal India* (Cambridge, UK: Cambridge University Press, 1992); and Daniel Walker, *Flowers Underfoot: Indian Carpets of the Mughal Era* (New York City: Metropolitan Museum of Art, 1997).

[2] An essential study of the Mughal *karkhana* system, albeit from a strictly economic perspective, is Tripta Verma, *Karkhanas under the Mughals: From Akbar to Aurangzeb, A Study in Economic Development* (New Delhi: Pragati Publications, 1994).

[3] Abu'l Fazl, for example, claims there are "more than one hundred offices and workshops, each resembling a city, or rather a little kingdom..." (Abu'l Fazl 'Allami, *The A'in-i Akbari*, trans. Henry Blochmann, 2nd edition [Calcutta: The Asiatic Society of Bengal, 1927], 12; and Abu'l Fazl 'Allami, *A'in-i Akbari*, ed. Henry Blochmann, 2 vols. [Repr., Osnabrück: Biblio Verlag, 1985], 1:9).

[4] António de Monserrate, *The Commentary of Father Monserrate, S.J.*, trans. J.S. Hoyland (Calcutta: Oxford University Press, 1922), 201.

instruction as to the types of illustrations (double- or single-page) that artists were expected to produce.[5] A workshop or project manager also provided directives indicating the length of time in which the paintings were to be completed. Of signal importance are the numerous marginal inscriptions that identify the artists responsible for the various aspects of the paintings' completion, such as the design (*tarh*) and coloring-in (*'amal* or *rang-amizi*) of the compositions—tasks that were often assigned to two different individuals (Fig. 1). (Exceptions to this paradigm are the so-called *de luxe* manuscripts, which typically include fewer than fifty highly refined illustrations, each often, though not always, executed by a single artist.[6]) Drawing on this documentation, scholars have established that the late sixteenth-century Mughal *kitabkhana* employed over 100 artists and that it was a decidedly hierarchical institution, wherein senior artists (usually designers) frequently collaborated with their more junior colleagues (usually colorists). The marginal inscriptions also reveal that the production teams for heavily illustrated manuscripts like the 1582/3–6 *Razmnama* ("Book of War," an abridged Persian translation of the *Mahabharata*, with 168 illustrations), the circa-1584–7 *Tarikh-i Khandan-i Timuriyya* ("History of the House of Timur," with 118 illustrations), and the circa-1585–8 *Ramayana* ("Story of Rama," with 176 illustrations) each employed between roughly fifty and sixty artists. In her 1977 PhD thesis, Ellen Smart utilized FAMULUS, a computerized bibliographical sorting and indexing program developed in the late 1960s by the Forest Service at the U.S. Department of Agriculture, to analyze the frequency of artist ascriptions from nine late sixteenth-century Mughal illustrated manuscripts. The results of this study showed that the majority

of the painters on each of these production teams "worked on two or fewer paintings," while a select few were credited with working on a very large number of paintings.[7] As promising as Smart's unprecedented computational examination was, neither this methodology nor one similar to it has been used in any published study of the Mughal workshop since.

Figure 1. Illustration from a fragmentary copy of the *Akbarnama* (Book of Akbar) showing Emperor Akbar inspecting trophies of a hunt. The Persian inscription in red in the lower margin of the page credits L'al for the design (*tarh*) and Keshava Khurd for the coloring (*'amal*) of the composition. Opaque watercolor on paper, page: 38.1 × 22.4 cm; completed either circa 1586–9 or 1590–5. © Victoria and Albert Museum, London, IS.2:93-1896.

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[5] John Seyller, "Scribal Notes on Mughal Manuscript Illustrations," *Artibus Asiae* 48, no. 3/4 (1987): 247–77.

[6] The artists credited with the execution of the illustrations in *de luxe* manuscripts are the very same individuals who were also involved in the collaborative production of paintings in more densely illustrated manuscripts. On *de luxe* manuscripts created at Akbar's court, see John Seyller, "The School of Oriental and African Studies *Anvār-i Suhaylī*: The Illustration of a *De Luxe* Mughal Manuscript," *Ars Orientalis* 16 (1986): 119–51; and idem, *Pearls of the parrot of India: The Walters Art Museum* Khamsa *of Amīr Khusraw of Delhi* (Baltimore, MD: Walters Art Museum, 2001).

[7] Ellen Stevens Smart, "Paintings from the *Baburnama*: A Study of Sixteenth-Century Mughal Historical Manuscript Illustrations" (PhD diss., School for Oriental and African Studies, University of London, 1977), 352. Note that included among the nine manuscripts that Smart analyzed for this study are the Jaipur *Razmnama* and the Patna *Tarikh-i Khandan-i Timuriyya*. On the origins of FAMULUS, see Hillary D. Burton, Robert M. Russell, and Theodor B. Yerke, "FAMULUS: A Computer-based System for Augmenting Personal Documentation Efforts," *U.S.D.A. Forest Service Research Note PSW-193* (1969): 1–6.

This essay aims to expand upon Seyller's and Smart's foundational studies of the Mughal *kitabkhana* by using the evidence of artist ascriptions in heavily illustrated manuscripts associated with a roughly six-year period of Akbar's patronage, when the court was based first at Fatehpur Sikri and then, from 1585, in Lahore. These include the aforementioned 1582/3–6 *Razmnama* (Maharaja Sawai Man Singh II City Palace Museum, Jaipur), the circa-1584–7 *Tarikh-i Khandan-i Timuriyya* (Khuda Bakhsh Oriental Library, Patna; MS 551), and the circa-1585–8 *Ramayana* (Maharaja Sawai Man Singh II City Palace Museum, Jaipur). The *Tarikh-i Khandan-i Timuriyya* documents the history of the Mughals' ancestor Timur (1336–1405); the other two texts, however, are Persian renderings of the sacred Hindu epics the *Mahabharata* and the *Ramayana*.[8] The production of extensive painting cycles may very well have been inspired by the spate of picture-dense historical manuscripts created in Timurid Herat and Shiraz during the fifteenth century, but the Mughal atelier's extension of this comprehensive illustrative treatment to Persian translations of Hindu sacred texts reveals the extent to which Akbar's patronage departed from the model set by his forebears.[9] To be clear, the imperial atelier produced many other heavily and less heavily (i.e., *de luxe*) illustrated manuscripts during the 1580s–early 1600s, some of which will be referenced in the main body of this article, but I have here chosen to focus primarily on these three heavily illustrated manuscripts because they contain a significant proportion of the extant manuscript paintings completed in the imperial

atelier between 1582–88.[10] Since the majority of these illustrations were produced collaboratively over a concentrated span of time, they further provide a means to track the relative stability (or instability) of subgroup working clusters.[11] Like Smart, I have used computational analysis to process the large amount of metadata (as artist ascriptions in the extant manuscripts of this period number in the many hundreds), but unlike Smart, I have chosen to focus only on cases where two artists—a designer and a colorist—worked on a single painting. In limiting the purview of the investigation to these instances of collaboration, patterns emerge that help to clarify our understanding of the structure of the Mughal workshop and, in turn, move scholarship beyond previous studies' preoccupations with the influence of individual "master" artists. I have additionally employed a software program that, unlike FAMULUS, uses graph statistics and visualizations to identify different types of networked relationships. I was therefore able to compare artists' centrality—rather than frequency alone—among numerous collaborations and

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[8] During the 1570s–80s, the Mughal translation bureau (*maktab-khana*) embarked on an ambitious project to render multiple texts, including the *Mahabharata* and *Ramayana*, into the official court language of Persian. On the illustration of manuscript copies of the latter two texts, see, e.g., John Seyller, "Model and Copy: The Illustration of Three *Razmnama* Manuscripts," *Archives of Asian Art* 38 (1985): 37–66; idem, *Workshop and patron in Mughal India: the Freer Rāmāyaṇa and other illustrated manuscripts of 'Abd al-Raḥīm* (Zurich: Artibus Asiae, 1999); Asok Kumar Das, *Paintings of the Razmnama: The Book of War* (Ahmedabad: Mapin Publishing, 2006); and Yael Rice, "A Persian Mahabharata: The 1598–1599 *Razmnama*," *Manoa* 22, 1 (2010): 125–131. On the translation of the *Mahabharata* into Persian at Akbar's court, see Audrey Truschke, "The Mughal Book of War: A Persian Translation of the Sanskrit *Mahabharata*," *Comparative Studies of South Asia, Africa and the Middle East* 31, 2 (2011): 506–520.

[9] According to Truschke, the Mughal translators understood the *Mahabharata* as "fantastical" or "disputed" (as opposed to confirmed) history and generally treated it "as a text that is not primarily religious but nonetheless involves many gods and addresses religious concerns" (op. cit., 515). The *Tarikh-i Khandan-i Timuriyya*, the *Akbarnama*, and other related court chronicles, in contrast, seem to have been deemed more properly historical in nature.

[10] These works were not necessarily graded or valued more highly than manuscripts—usually poetic in content—that possessed fewer illustrations. As John Seyller has shown, none of the three manuscripts that are the focus of this study received an *awwal awwal* ("first first") rating, the highest designation documented on an illustrated manuscript belonging to the Mughal library. Rather, painting for painting, the illustrations in poetic manuscripts—especially those associated with the Mughals' Timurid forbears and/or particularly esteemed calligraphers—were estimated more highly than those in the more densely illustrated histories and epics produced during the 1580s–early 1600s. To give one example, a *Khamsa* (Quintet) of Nizami (British Library, Or. 6810) with twenty-one illustrations, which is associated with the court of the Timurid prince Sultan Husayn Bayqara (d. 1506) in Herat, bears a Mughal valuation of 5,000 rupees and a rating of *awwal awwal*, while the Jaipur *Ramayana*, with 176 illustrations, was valued at 1,516 rupees and given the slightly lesser rating of *awwal duwum* ("first second"). See Seyller, "The Inspection and Valuation of Manuscripts in the Imperial Mughal Library," *Artibus Asiae* 57, 3/4 (1997): 243–349, 274.

[11] Between 1580 until the end of Akbar's reign, the imperial *kitabkhana* produced an enormous number of manuscript illustrations, including those for an incomplete copy of the prose romance the *Darabnama* ("Story of Darab," with 157 extant illustrations; British Library, London, Or. 4615); two copies of Nizami's poetic *Khamsa* ("Quintet," with 34 and 43 extant illustrations respectively; de Unger Collection and British Library, Or. 12208); four copies of the *Baburnama* ("Memoirs of Babur," with 111, 149, 133, and 180 illustrations respectively; various collections); at least two incomplete copies of the *Akbarnama* ("Book of Akbar," with 116 and 100 extant illustrations respectively; Chester Beatty Library, Dublin, Ms. 3, and British Library, Or. 12988); a copy of the *Chinghiznama* ("Book of Chinghiz [Genghis] Khan," with 98 illustrations; Gulistan Library, Tehran); a copy of Amir Khusraw Dihlavi's *Khamsa* ("Quintet," with 29 illustrations; divided between the Walters Art Museum, Baltimore and the Metropolitan Museum of Art, New York City); and a now incomplete copy of the *Razmnama* ("Book of War," with 149 illustrations; dispersed). This list is by no means exhaustive (it excludes, for example, illustrated manuscripts of the prose *Tutinama* ["Tale of the Parrot"], produced around 1580; Jami's poetic *Baharistan* ["Abode of Spring"] dated 1595; and multiple copies of the *Iyar-i Danish* ["Touchstone of Wisdom"]; among others) and does not account for the many illustrated manuscript pages that have been dispersed worldwide. Suffice to say, the imperial atelier's staff of 100-plus artists was extremely active during this roughly twenty-five-year period making illustrated manuscripts for the emperor's and other royals' consumption. The accession of Jahangir, Akbar's son and successor, to the Mughal throne in 1605 marks a distinct shift in practice as the atelier, significantly reduced in size, shifted its attention away from heavily illustrated historical manuscripts to albums and *de luxe* manuscripts.

across three different manuscripts. The results of this study, as will be seen, offer a more nuanced, diachronic picture of painters' working practices in the imperial *kitabkhana* of the 1580s than Seyller's analogue or Smart's computational analyses have so far advanced.

This study also throws light on a problem that has dogged art historians for decades: the question of the formation of the Mughal painting style during the sixteenth century.[12] Scholars have posited that the unique illustrative idiom that developed at Akbar's court was a product of the cultural synthesis of Persianate and Indic knowledge systems—a logical assumption given the status of the Mughals as Turko-Mongol transplants in South Asia, and given the geographically diverse origins of the artists they employed. However, the way in which this process was instantiated in the workshop has not been adequately addressed beyond identifying the emperor and a select few "master" artists as catalysts. Here I propose that the particular structure of the manuscript atelier at the time, which was one that fostered a large number of acquaintanceships among many artists rather than a small number of intimate relationships among only a few, played an integral part in the commixture of practices or styles.

Methods and Challenges

Artist ascriptions in late sixteenth-century Mughal manuscripts vary in their contents. So-called *de luxe* manuscripts, which usually contain fewer than fifty illustrations, often of very high quality, typically bear inscriptions that credit each painting to one artist alone. These singly authored illustrations may have served as a means to

showcase the skills of the most accomplished and esteemed members of the imperial atelier. On the other hand, the paintings that appear in the more heavily illustrated manuscripts, usually historical texts or epics, very often include Persian inscriptions identifying the two or sometimes three artists who completed the design (*tarh*), the coloring ('amal* or *rang-amizi*), and—a less commonly occurring notation—the portraits of important figures (*chihreh-yi nami*). Indeed, the evidence of these inscriptions registers just how commonplace the collaborative mode of production was at this point in time: 128 (79.5%) of the Jaipur *Razmnama*'s 161 illustrations bearing artist ascriptions are attributed to more than one painter; 48 (40.6%) of the *Tarikh-i Khandan-i Timuriyya*'s 118 ascribed illustrations are attributed to more than one artist; and 130 (79.3%) of the Jaipur *Ramayana*'s 164 illustrations bearing artist ascriptions are attributed to more than one painter. It is crucial to clarify that these inscriptions are not signatures, but rather ascriptions that a project manager or workshop director penned during the manuscripts' production, perhaps for the purpose of tracking labor expenditures and evaluating artists' work.

Since the present study is concerned with how court artists worked in tandem, I limited the sample size to three heavily illustrated manuscripts produced over a limited period of time and, further, to those illustrations that have ascriptions identifying both a designer and a colorist.[13] The former laid out the narrative illustration's composition in black, grey, or brown ink; this design was then passed to the colorist to fill in with paint. Since these tasks required that the designer and the colorist cooperate with one another, it can be assumed that in each case the painting is the fruit of a collaborative enterprise. By mapping the connections—known in the parlance of Social Network Analysis as ties or

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[12] On the formation of the Mughal imperial painting style, see Pramod Chandra, *The Tūṭīnāma* (Graz: Akademische Druck- u. Verlagsanstalt, 1976); John Seyller, "Overpainting in the Cleveland Tūṭīnāma," *Artibus Asiae* 52, 3/4 (1992): 283–318; John Seyller et al, *The Adventure of Hamza: Painting and Storytelling in Mughal India* (Washington, D.C.: Freer Gallery of Art and Arthur M. Sackler Galleries, Smithsonian Institution, 2002), especially 44–51; and, more recently, Sonya Rhie Quintanilla, "The *Chandayana* and Early Mughal Painting," in *Indian Painting: Themes, History and Interpretations; Essays in Honour of B. N. Goswamy*, eds. Mahesh Sharma and Padma Kaimal (Ahmedabad: Mapin Publishing, 2013), 105–24; Valerie Gonzalez, *Aesthetic Hybridity in Mughal Painting, 1526–1658* (Burlington, VT: Ashgate Publishing, 2015); and Kavita Singh, *Real Birds in Imagined Gardens* (Los Angeles: Getty Research Institute, 2017).

[13] Those manuscript illustrations that bear an ascription identifying only one artist (or that credit the designing and coloring to the same artist) were, in turn, excluded from my sample set—not because the paintings or the artists are insignificant, but because they represent lone, unconnected nodes in the larger network and therefore would not illuminate the manner and frequency of artistic collaboration on that particular production team.

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edges—between designers and colorists, one can track who worked with whom, and how often. The manuscript production team is, in this sense, understood to operate as a social network, with the various actors (painters, in this case) functioning as nodes or vertices; the appearance of ties or edges indicates instances of collaboration between actors. Because I was mainly concerned with mapping the co-production of workshop practice, rather than showing the distribution of influence, the network graphs I created are undirected, meaning that the transfer of knowledge between a designer and a colorist is, in these instances, assumed to be bidirectional. For this reason a colorist, by virtue of the frequency of his participation in designer-colorist collaborations, may be shown to possess a high degree of centrality within a given production team, even though he may be considered to be a junior or lower-ranking artist in the larger context of the workshop.

Social Network Analysis (SNA), a method for examining the structures of social groups using graph theory and visualizations, is a natural fit for a study of this type since it allows one to investigate the Mughal workshop in its totality, but also at the granular level. SNA can be used to determine a network's degree of centralization and the strength (or weakness) of its ties. It can also show which artists are the most highly connected (those nodes that have many ties) and which are the least connected (those nodes that have comparatively fewer ties). Centrality, or influence, is defined variably, however. Betweenness centrality, for example, measures the number of times that a vertex serves as a bridge on the shortest path between two other vertices. Degree centrality, a conceptually more simplistic calculation, is a measurement of the number of ties that a node has. Both of these measures gauge a node's influence, but the former offers a more sensitive calculus, which can take into account the outsize status of actors who may possess both low degree centrality *and* high betweenness centrality. Thus, SNA can bring greater nuance to the study of

influence and practice in the Mughal painting workshop, although it does present certain hurdles for those unfamiliar with its methods and conceptual frameworks. Further, to my knowledge, scholars have yet to adapt SNA methods for the study of Mughal artists; rather, most of the art historical scholarship in this vein has been advanced by specialists who work on early modern Europe and modernism broadly conceived.[14] Among the disadvantages that the Mughal art historian faces, in contrast to her colleagues in these other fields, is a significant dearth of information on imperial artists, due to the absence (or possible destruction) of archival records, among other sources. Indeed, for the majority of the one hundred-plus artists employed in Akbar's atelier, the only biographical information that is extant is that which appears in the marginal ascriptions of illustrated manuscripts.

The task of collecting, editing, and cleaning the data presented its own challenges. All of the artists' names were entered manually.[15] In several cases, due to the impossibility of viewing certain manuscripts in person, I instead consulted digital editions and printed catalogues.[16] The authors of these catalogues used different systems of transliteration, from Persian to Roman characters;

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[14] For a sample of recent SNA studies in the field of art history, see http://historicalnetworkresearch.org/resources/bibliography/#Art History (accessed September 13, 2017). Also see Matthew Lincoln, "Social Network Centralization Dynamics in Print Production in the Low Countries, 1550–1750," *International Journal of Digital Art History* 2 (2016): http://journals.ub.uni-heidelberg.de/index.php/dah/article/view/25337 (accessed September 13, 2017); and Christina Weyl, "Networks of Abstraction: Postwar Printmaking and Women Artists of Atelier 17," Archives of American Art website: http://www.aaa.si.edu/essay/christina-weyl (accessed September 13, 2017).

[15] I wish to acknowledge Jordan Samuels, alumna of Amherst College (class of 2017), who provided invaluable assistance with this component of the project.

[16] Since the Jaipur *Razmnama* and *Ramayana* manuscripts have been inaccessible to scholars for many years, I relied on the inscriptional data recorded in Thomas Holbein Hendley, *Memorials of the Jeypore Exhibition, 1883*, vol. 4 (London, 1883); Som Prakash Verma, *Mughal Painters and their Work: A Biographical Survey and Comprehensive Catalogue* (Delhi: Oxford University Press, 1994); John Seyller, *Workshop and Patron in Mughal India: The Freer Rāmāyaṇa and other Illustrated Manuscripts of 'Abd al-Raḥīm* (Zürich: Artibus Asiae, 1999), 323–27; and Asok Kumar Das, *Paintings of the* Razmnama*: The Book of War* (Ahmedabad: Mapin Publishing, 2005). I am grateful to Asok Das for sharing information about artist ascriptions for illustrations that Hendley did not reproduce in the 1883 volume. For illustrations from the former manuscript, see, among other places, Hendley, op. cit.; and John Seyller, "Model and Copy: The Illustration of Three *Razmnama* Manuscripts," *Archives of Asian Art* 38 (1985): 37–66. Select illustrations from the Jaipur *Ramayana* have been published in Asok Kumar Das, "An Introductory Note on the Emperor Akbar's *Ramayana* and its Miniatures," in *Facets of Indian Art: A Symposium Held at the Victoria and Albert Museum*, eds. Robert Skelton et al (London: Victoria and Albert Museum, 1996), 94–104; and idem, "Akbar's Imperial *Ramayana*: A Mughal Persian Manuscript," in *The Legend of Rama: Artistic Visions*, ed. Vidya Dehejia (Bombay: Marg Publications, 1994), 73–84. For select illustrations from the *Tarikh-i Khandan-i Timuriyya*, see *Timur nama: Tarikh-e Khandan-e Timuria* (Patna: Khuda Bakhsh Oriental Public Library, 1993).

additional discrepancies among artists with similarly sounding names also emerged. For these reasons, I streamlined the data in order to achieve a modicum of consistency in the transliteration of the inscriptions and, as a rule, I chose to preserve, rather than limit, seeming duplications in the names of the artists. Thus, to give one example, the ascriptions identifying 'Keshava,' 'Keshava Kalan' (Keshava the Senior), and 'Keshava Khurd' (Keshava the Younger), which may refer to two or three different artists, were all retained in my spreadsheets. Along these same lines, I chose to retain the two names Madhava Khurd and Madhava Chela ('Madhava the Disciple'), since both names appear in ascriptions in the very same manuscripts, suggesting that they indeed refer to separate individuals. Since the names Banwali and Banwari appear to refer to the same person, I chose to dispense with the second spelling (i.e., Banwari) entirely.[17]

I used Gephi, an open-source network visualization program, to produce the network graphs. Gephi offers a less-than-intuitive platform, especially for those unfamiliar with network graphing, let alone computational analysis. I was therefore fortunate to receive the necessary training as a participant in the Getty-funded digital art history summer institute "Beyond the Digital Slide Library" at the University of California, Los Angeles during the summer of 2015.[18] For a range of conceptual approaches to the study of networks and workshops, I drew inspiration from digital humanities studies in archaeology, history, and art history.[19]
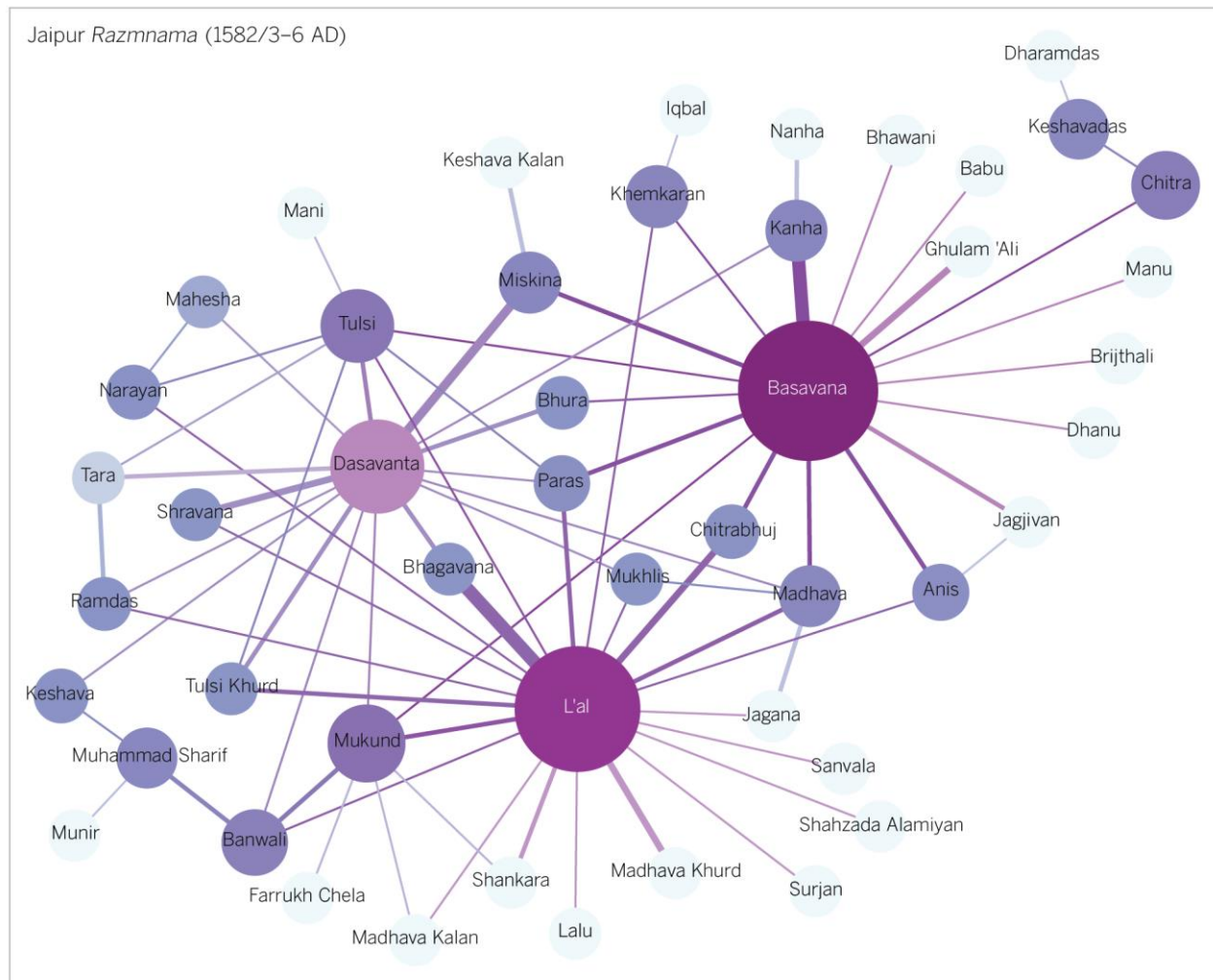
Patterns of Collaboration

Measuring for betweenness centrality across the three manuscripts produces mostly unsurprising results. On the whole, the results accord with Abu'l Fazl's *A'in-i Akbari* (Institutes of Akbar), a contemporaneous court text that identifies Dasavanta, Basavana, Keshava [Kalan?], and L'al—in this particular order—as the "forerunners" [*pish-rivan*] of Akbar's painting workshop.[20] In the Jaipur *Razmnama*, the earliest dated manuscript of the group, Basavana, L'al, and Dasavanta have the highest betweenness centrality ranking among the approximately forty-eight artists whose names appear in the marginal ascriptions, meaning that these three most frequently served as the bridges linking other members of the production team along the network's shortest paths (Fig. 2). In the *Tarikh-i Khandan-i Timuriyya*, Basavana, at number one, and L'al, at number three, again emerge as central players (Fig. 3). Less expected is the artist Surjan's betweenness centrality ranking at number two. Here Surjan, who worked solely as a colorist in the *Tarikh-i Khandan-i Timuriyya* manuscript, attained his outsize status on this production team as a result of his collaborations with influential painters like L'al, Keshava Kalan, and Basavana, who were, in turn, also well connected. Despite the absence of his name from Abu'l Fazl's list of forerunners, Surjan—in this manuscript, at least—appears to have served as a kind of hub, linking well connected, actively participating artists with one another. The absence of Dasavanta from this list, and indeed his minimal presence among the *Tarikh-i Khandan-i Timuriyya* production teams overall, can be attributed to his death, reportedly, according to Abu'l Fazl's *A'in-i Akbari*, by suicide.[21] Finally, for the Jaipur *Ramayana*, which was completed only one year later, L'al is ranked first, Keshava Kalan second, and Basavana third in betweenness centrality (Fig. 4). Surjan's name does not appear in any of the Jaipur *Ramayana* ascriptions.

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[17] Asok Kumar Das comes to the similar conclusion that 'Banwari' and 'Banwali' likely refer to the same artist (see Das, "Notes on the Emperor Akbar's Manuscript of the Persian *Ramayana*," in *Asian Variations in Ramayana: Papers Presented at the International Seminar on "Variations in Ramayana in Asia: Their Cultural, Social and Anthropological Significance," New Delhi, Jan. 1981*, ed., K.R. Srinivasa Iyengar [New Delhi: Sahitya Akademi, 1983], 144–53, 150).

[18] I am indebted to the institute instructors Miriam Posner, Johanna Drucker, and Todd Presner for their guidance. I wish also to acknowledge Allison Hegel, graduate student in English at UCLA, who provided invaluable assistance navigating Gephi, and Casey Quinn for his help interpreting network diagrams and histograms.

[19] See, for example, Carl Knappett, ed., *Network Analysis in Archaeology: New Approaches to Regional Interaction* (Oxford: Oxford University Press, 2013); Irad Malkin, *A Small Greek World: Networks in the Ancient Mediterranean* (Oxford: Oxford University Press, 2011); Oliver P. Gosselain, "Social and Technical Identity in a Clay Crystal Ball," in *The Archaeology of Social Boundaries*, ed. Miriam T. Stark (Washington, DC: Smithsonian Institution, 1998), 78–106; and John F. Padgett and Christopher K. Ansell, "Robust Action and the Rise of the Medici, 1400–1434," *American Journal of Sociology* 98, no. 6 (May 1993): 1259–1319. Also see the studies cited in n14.

[20] Abu'l Fazl 'Allami, *A'in-i Akbari*, trans. C.M. Naim in Chandra, *The Tūtīnāma*, 183; and Abu'l Fazl 'Allami, *A'in-i Akbari*, ed. Henry Blochmann, 1:117.
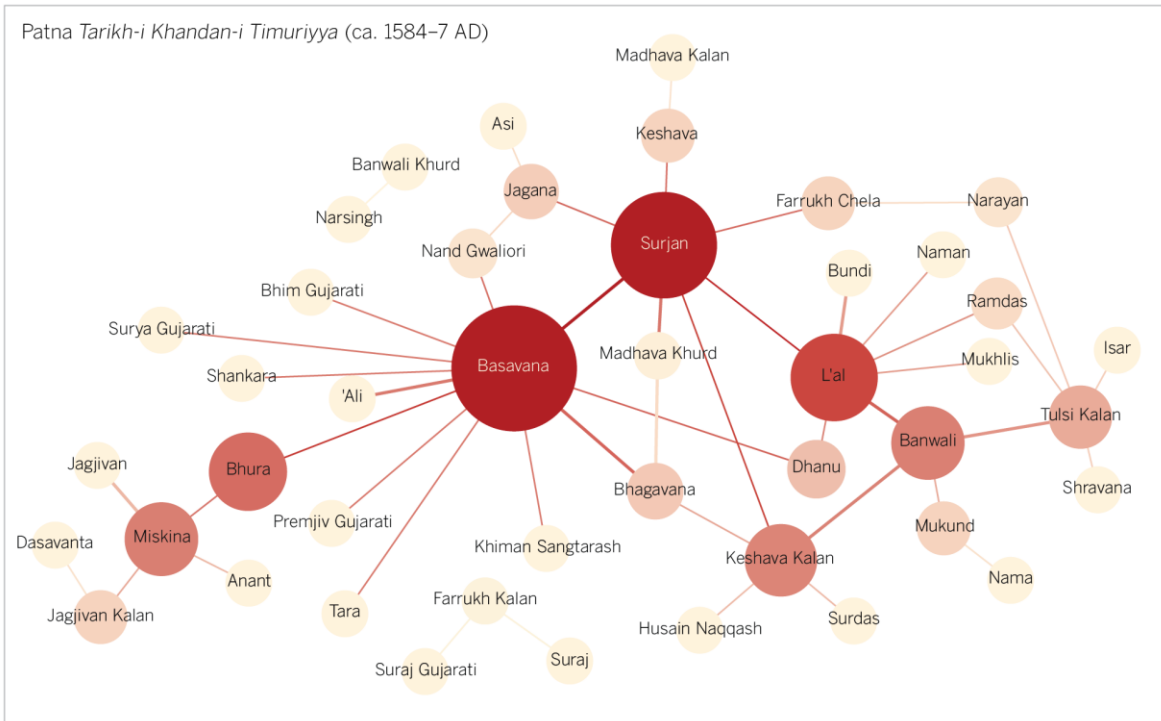
[21] Ibid.

Figure 2. Network diagram showing betweenness centrality of collaborators (designers and colorists) on the Jaipur *Razmnama* manuscript illustrations. The larger and more highly saturated a node, the higher its betweenness centrality. Thicker and more highly saturated edges (or ties) indicate a greater number of collaborations between two nodes.

Let us now turn to look at subgroups of artists across the three manuscripts' production teams. By 'subgroup,' I mean clusters of artists who worked together on a given manuscript project. Since production teams included many more colorists than designers, these clusters typically assume a centralized or pinwheel appearance, with a larger number of artists (usually colorists) tied to one or two artists (usually designers) at the center of the network (see, e.g., Figs. 2–4). Some artists worked in both capacities as designers and colorists. In the case of the Jaipur *Razmnama*, the names of L'al, Basavana, and Dasavanta appear a total number of ninety-five times, with L'al identified as designer thirty-four times and as

colorist eight times; and Dasavanta identified as designer twenty-four times and as colorist twice. The remaining 195 ascriptions identify around forty-nine different artists, the majority of whom cluster around L'al, Basavana, and Dasavanta— among several other hubs—on the network graph. The subgroup that collects around L'al, to take one example, includes twenty-two artists: Surjan, Sanvala, Madhava, Madhava Khurd, Madhava Kalan, Shahzada Alamiyan, Lalu, Khemkaran, Chitrabhuj, Anis, Paras, Mukhlis, Jagana, Tulsi, Tulsi Khurd, Narayan Shravana, Bhagavana, Ramdas, Banwali, Mukund, and Shankara.[22]

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[22] In only two of these instances—that is, in collaborations with Madhava and Mukunda—did L'al function in the capacity of a colorist.

Figure 3. Network diagram showing betweenness centrality of collaborators (designers and colorists) on the Patna *Tarikh-i Khandan-i Timuriyya* manuscript illustrations. The larger and more highly saturated a node, the higher its betweenness centrality. Thicker and more highly saturated edges (or ties) indicate a greater number of collaborations between two nodes.
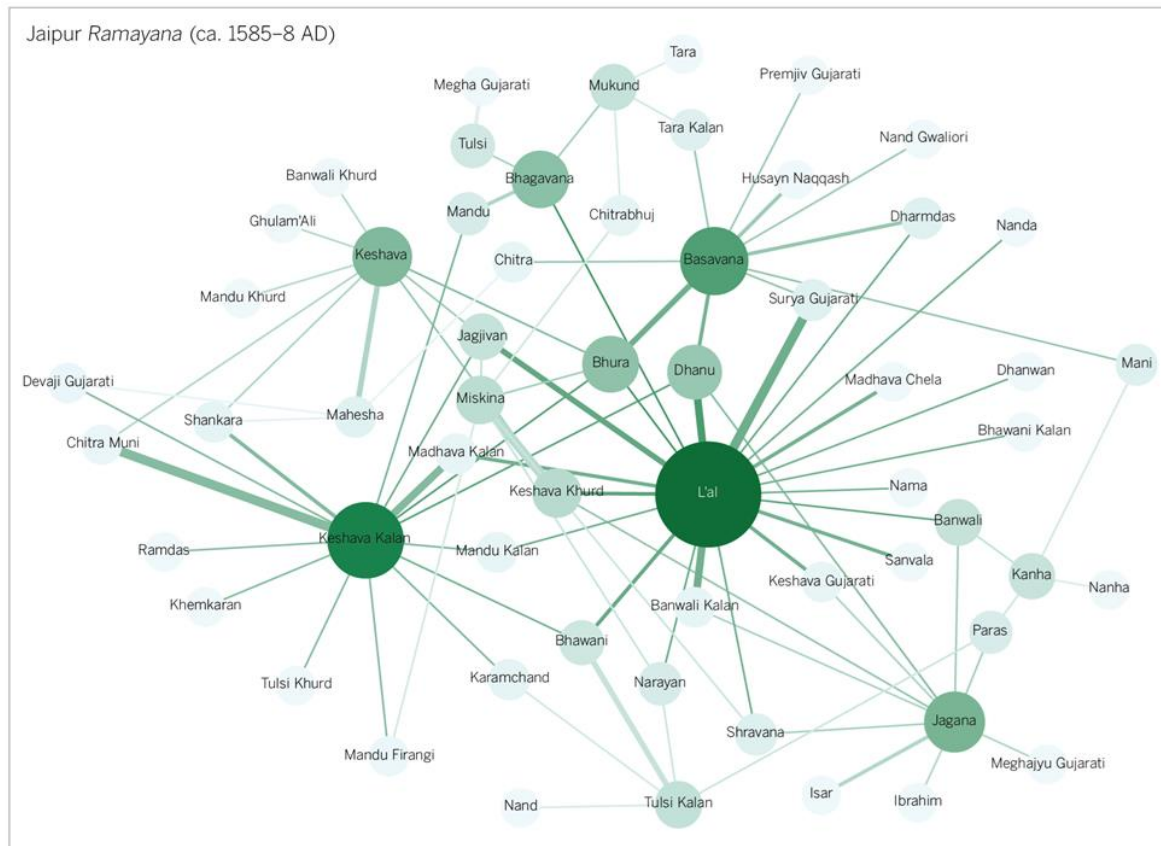
Figure 4. Network diagram showing betweenness centrality of collaborators (designers and colorists) on the Jaipur *Ramayana* manuscript illustrations. The larger and more highly saturated a node, the higher its betweenness centrality. Thicker and more highly saturated edges (or ties) indicate a greater number of collaborations between two nodes.

While seventeen of these artists collaborated with others, the remaining five enjoyed exclusive partnerships with L'al, meaning that they did not work with any other artists in the production of the *Razmnama* paintings. Even among the seventeen collaborators who did partner with other artists, two of them (Chitrabhuj and Bhagavana) worked with L'al somewhat more frequently than with any other single individual.[23] One conclusion that may be drawn from these results is that subgroups like this one were formed based on shared professional, social, sectarian, or familial associations. As a result, it would be expected that membership in these subgroups would remain relatively stable from one manuscript to the next.

It may come as little surprise that this hypothesis is not entirely supported by the data. In the illustrated manuscript of the related Jaipur *Ramayana*, L'al partnered with twenty-one collaborators, six of whom (Bhagavana, Banwali, Sanvala, Narayan, Shravana, and Madhava Kalan) had worked with him on the earlier *Razmnama* illustrations (see Fig. 4). Of these six, only Bhagavana had been a frequent collaborator of L'al's in the previous manuscript. Chitrabhuj— L'al's other more frequent collaborator from the *Razmnama* project—partnered with different artists entirely. Paras, Jagana, Tulsi, and Tulsi Khurd, four of L'al's other collaborators from the *Razmnama*, also teamed up with different artists on the *Ramayana* illustrations.

The network diagram for the nearly contemporaneous Patna *Tarikh-i Khandan-i Timuriyya* reveals similar discontinuities across artist subgroups (see Fig. 3). Here among L'al's seven collaborators, four artists had also worked with him on the *Razmnama* illustrations, and two had worked with him on the *Ramayana*. Three additional artists—Narayan, Madhava Kalan, and Bhagavana—partnered with L'al on both the

Razmnama and *Ramayana* manuscripts, but they then worked with different artists on the *Tarikh-i Khandan-i Timuriyya* illustrations.

In tracking the artists who collaborated with L'al over the course of the three projects, it becomes evident that the production subgroups in which he was involved shifted in composition from one illustrated manuscript to the next. These inconsistencies cannot be explained by the uneven participation of these artists across the three projects: the painters Paras, Shankara, Jagana, Tulsi, Tulsi Khurd, Ramdas, Chitrabhuj, Mukund, and Khemkaran, for example, worked on both the *Razmnama* and the slightly later *Ramayana* manuscript, but each collaborated with L'al in the former case only. Banwali, Bhagavana, Madhava Kalan, Narayan, and Sanvala, meanwhile, worked with L'al on both the *Razmnama* and *Ramayana* manuscript illustrations, but while every one of these artists also participated in illustrating the *Tarikh-i Khandan-i Timuriyya*, Banwali was the only one from this group who collaborated with L'al on the latter manuscript.[24]

Similarly variable patterns of collaboration are in evidence among other circles of artists. Kanha, for example, partnered with Basavana on six illustrations (five times as colorist, once as designer) in the *Razmnama* manuscript. As a point of comparison, Kanha's collaborators on this same manuscript project also included Dasavanta, with whom he worked one time only, and Nanha, with whom he worked twice. With the exception of Bhagavana and L'al, no other pair of artists is recorded as having collaborated as many times as Basavana and Kanha did on the *Razmnama* illustrations,[25] yet in the subsequent *Ramayana* manuscript, the two artists did not work together at all.

The foregoing examples suggest that the membership of production team subgroups

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[23] Chitrabhuj collaborated with L'al three times and with Basavana twice, while Bhagavana collaborated with L'al six times and with Dasavanta two times, and he also worked unaccompanied (according to the appearance of his name alone in select ascriptions) two times.

[24] Note that Sanvala does not appear on the network diagram in figure 3, for the reason that he participated in this project as a portraitist rather than as a designer or colorist.
[25] The next closest comparisons are Chitrabhuj and L'al, who collaborated to complete three different *Razmnama* illustrations. Bhagavana and L'al are recorded as having worked together on six illustrations in the same manuscript.

fluctuated from project to project, thus belying the notion that artists employed in Akbar's manuscript workshop maintained consistent, stable working relationships during the extremely productive period of the 1580s. To what extent, however, does this observation also extend to artists who were related by blood? Prosopographical information provided in the marginal inscriptions allows us to identify various family groups, including fathers and sons, siblings, and, in one instance, an uncle and a nephew. One such pair, comprising Mahesha and his son Miskina, worked on the *Razmnama* manuscript, but while both artists collaborated as colorists with Dasavanta (and were thus members of the same subgroup), they did not partner with other another.[26] For the *Ramayana* completed just several years later, Mahesha and Miskina once again did not work together, even though both worked interchangeably as colorist and designer, and so theoretically could have collaborated on one of the manuscript's illustrations. Even more surprisingly, they did not share a single collaborator over the duration of the manuscript's completion.[27] The father and son did pair up for one illustration in the Victoria and Albert *Akbarnāma*, variously dated between 1586–9 and 1590–5, but this collaboration seems to have been an exception to the rule.[28]

Ramdas, another active contributor in Akbar's workshop, had two sons, Shankara and Nand, who were also artists. Only Ramdas and Shankara are recorded as participants in the production of the *Razmnama* manuscript, and while the two artists did not work together on any of the *Razmnama*'s illustrations, they did share a collaborator in L'al.[29] For the subsequent *Tarikh-i Khandan-i Timuriyya* manuscript, Ramdas and Shankara worked with

entirely different collaborators.[30] In the related Jaipur *Ramayana* manuscript, the father and son again did not collaborate. They both, however, worked with Keshava Kalan, meaning that they once more enjoyed membership in the same subgroup. What is most curious is that while Nand apparently also worked on the *Ramayana* illustrations, neither his father nor his brother was among his collaborators. To be fair, the two brothers and the father appear to have operated in this instance solely in the capacity of colorists, meaning that it is unlikely they would have collaborated with each other in any case. But Nand also did not work with Keshava Kalan; he was, rather, part of an entirely different subgroup than his father and brother.[31]

Ties that Bind

There is evidence indicating that family members did, on occasion, work together in Akbar's *kitabkhana* during the 1580s, and that select pairs of artists collaborated with some regularity from one manuscript to the next. In general, however, these patterns do not hold with any degree of consistency. Rather, the composition of artist subgroups shifted as teams were assembled for each new manuscript project. These shifts could sometimes be quite pronounced, as suggested by L'al's oscillating patterns of collaboration across the *Razmnama*, *Tarikh-i Khandan-i Timuriyya*, and *Ramayana* manuscripts. Even family clusters were subject to these fluctuations. One might expect that a father-and-son or sibling pair of artists would make an ideal collaborating duo, but as the case examples discussed above demonstrate, these familial groups did not necessarily remain intact in the imperial workshop.

Pairing artists who had previous experience collaborating with one another might seem a logical strategy for a workshop beset with multiple

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[26] Miskina collaborated with Dasavanta four times, while Mahesha collaborated with him only once.

[27] Mahesha had four collaborators: Devaji Gujarati, Shankara, Chitra, and Keshava; and Miskina seven: Bhura, Keshava Khurd, Mandu Firangi, Narayan, Jagjivan, Chitrabhuj, and Shravana.

[28] The illustration in question is I.S. 2:99-1896, Victoria and Albert Museum, London. On the variable dating of the manuscript see John Seyller, "Codicological Aspects of the Victoria and Albert *Akbarnāma* and their Historical Implications," *Art Journal* 49, no. 4 (1990): 379–87; and Susan Stronge, *Painting for the Mughal Emperor: The Art of the Book, 1560–1660* (London: Victoria and Albert Museum, 2002), 36–85.

[29] Both father and son worked with L'al in the capacity of colorists.

[30] Ramdas here collaborated with L'al and Tulsi Kalan, while Shankara worked with Basavana.

[31] Nand's only collaborator on the *Ramayana* manuscript illustrations was Tulsi Kalan.

large-scale projects. The Mughal artist Kanha, for example, had partnered with Basavana six times in the context of the *Razmnama* manuscript. We have already observed that Basavana was Kanha's most frequent collaborator on this project, but the opposite is also true. Although Basavana was a much more frequent contributor to the *Razmnama* (his name appears a total of thirty-two times in the manuscript's marginal inscriptions), he is recorded as working with Kanha more often than with any other artist. Indeed Kanha and Basavana collaborated more frequently than did any other pair among the fifty-two or so artists associated with the manuscript, with the exception of L'al and Bhagavana, who also collaborated on six of the Jaipur *Razmnama* illustrations. Yet although both painters worked on the later *Ramayana*, they did not in this particular instance work *together*. Why were collaborations like these not sustained across multiple manuscript projects?

It is tempting to attribute the rotating membership of artist subgroups and partnerships to some defect in the Mughal manuscript atelier's operational procedures. Recall that the later sixteenth-century *kitabkhana* employed over 100 painters; the management of these artists must have been an onerous and unwieldy task. The workshop nevertheless seems to have functioned as a well-tuned machine, at least with regards to the coordination of illustration production teams. Indeed, the structure of these teams during this period remained relatively consistent from manuscript to manuscript (Fig. 5). That is to say, many of these teams comprised a small number of very active artists (i.e., their names appear frequently in the marginal ascriptions) and a very large number of minimally active artists. In both the *Razmnama* and the *Ramayana*, only a few artists are credited with designing or coloring the lion's share of the compositions, whereas the majority of the remaining artists' names appear in the manuscripts' marginal inscriptions far fewer times. This pattern remains consistent regardless of the number of illustrations in the manuscript: the marginal inscriptions in the so-called de Unger

Khamsa (Quintet) of Nizami, whose illustrations were completed around 1585, attribute the manuscript's thirty-four illustrations (twenty-five of which, according to the evidence of the ascriptions, were produced collaboratively) to twenty-six artists, sixteen of whose names appear only once (Fig. 6).[32] L'al, with the design of six paintings credited to him, once again assumed an outsize role in the de Unger *Khamsa*, a remarkable fact given that he was concurrently involved in the designing and coloring of many of the *Razmnama*, *Tarikh-i Khandan-i Timuriyya*, and *Ramayana* illustrations. The structural correspondences observed here suggest that the workshop operated according to a judicious and deliberate, rather than accidental, scheme, which was likely intended to streamline the production process. A large team of artists, after all, could complete a manuscript's illustrations far faster than a small team could. The more frequent involvement of certain artists like L'al and a few select others would have ensured congruity in the execution of paintings across multiple manuscripts.

Neither professional nor familial connections, moreover, appear to have factored significantly in the organization of Mughal manuscript production teams during the 1580s. Rather, other considerations—like the expeditious completion of illustrations—seem to have been given greater weight. The steady rotation of subgroup members further ensured that the responsibility of educating and overseeing novice painters was distributed among a group of more established artists. To give one example, Miskina, operating in the capacity of a colorist, collaborated with three different designers (Dasavanta, Basavana, and Keshava Kalan) on eight different illustrations in the *Razmnama*. Functioning mainly as a designer, Miskina worked with an entirely different cast of collaborators (Chitrabhuj, Keshava Khurd, Mandu Firangi, Narayan, Bhura, Shravana, and Jagjivan) in

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[32] With its small number of highly refined illustrations, the de Unger *Khamsa* fits the criterion for a *de luxe* manuscript, but unlike other works in this category, the majority of the paintings were collaboratively produced. The manuscript is also somewhat anomalous in that it is the product of a refurbishment campaign, the text having been copied by a certain 'Ali ibn Mubarak al-Fahraji in Yazd, Iran between 1502–6, and the paintings added at the Mughal court some eight decades later.
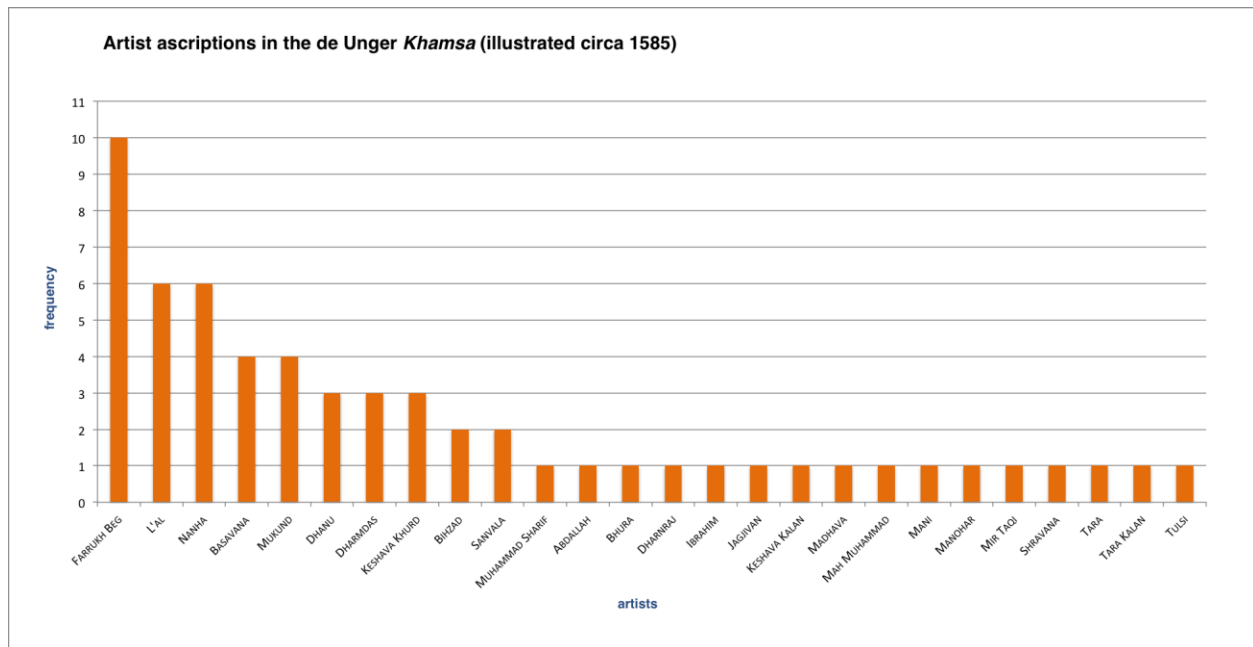
Figure 5. Frequency of appearance of artists' names in ascriptions in the Jaipur *Razmnama*, the Patna *Tarikh-i Khandan-i Timuriyya*, and the Jaipur *Ramayana* manuscripts.

Figure 6. Frequency of appearance of artists' names in ascriptions in the de Unger *Khamsa* manuscript.

the context of the later *Ramayana* manuscript. Miskina had also worked with Jagjivan and Bhura, as well as with two new associates, Anant and Jagjivan Kalan, to complete illustrations in the nearly contemporaneous *Tarikh-i Khandan-i Timuriyya*; his *Razmnama* and *Ramayana* collaborators Basavana, Keshava Kalan, Keshava Khurd, Narayan, and Shravana also contributed to the manuscript's illustrations, but were partnered with other painters.

To be sure, these arrangements facilitated the efficient training of novice workshop members by those select, more experienced artists—thus suggesting that the production of heavily illustrated manuscripts served an apprenticeship function—but they also guaranteed that both junior and senior artists enjoyed wide exposure to a large range of practices or ways of working (i.e., styles).[33] This situation stands in contrast to the

family-based network that constituted the style of painters working at the Pahari courts during the eighteenth and early nineteenth centuries.[34] The Mughal manuscript atelier of the 1580s eschewed any such constancy—familial or otherwise—and instead maximized the diversity of collaborations among artists. As a result, the ties among the workshop members were numerous, but they were also "weak," since many of these mutual collaborations occurred only once or a minimal number of times. Weak ties, in sociological terms, establish acquaintanceship, whereas strong ties inculcate closer, more intimate relationships. Yet weak ties also foster the widespread circulation of information and skill.[35] Networks comprised of strong ties, on the other hand, hinder the diffusion of knowledge as actors maintain connections with only a limited set of collaborators. For a workshop that employed over one hundred artists from various parts of South Asia (Rajasthan, Kashmir, Malwa, Bengal, Gujarat, etc.), Central Asia, Iran, among other places, a network of weak ties would

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[33] While 'style' has historically been understood as an intrinsic, ineffable cultural expression informed by one's ethnicity and geographic origins, I here use the term in a more materialist vein, where style is conceived as the result of artists' physical, technical, and social practices. For a recent study of the causes of style, and in particular the utility of a materialist approach, see Marian Feldman's forthcoming chapter, "Style as a Fragment of the Ancient World." A video recording of a version of this paper can be viewed here: https://podcasts.ox.ac.uk/style-fragment-ancient-world-view-iron-age-levant-and-assyria-0 (accessed October 2, 2017).

[34] On which, see B.N. Goswamy, "Pahari Painting: The Family as the Basis of Style," *Marg* 21, no. 4 (1968): 17–62.
[35] Mark Granovetter, "The Strength of Weak Ties," *American Journal of Sociology* 78, no. 6 (1973): 1360–80.

have promoted the broad dissemination of different modes of making. The structure of Akbar's imperial atelier, in other words, not only encouraged stylistic fusion; it made it possible—unavoidable, even.

The particular organization of the Mughal court's staff of painters may have also factored in the physical situation and arrangement of the workshop itself. Given that family members were not regularly paired with one another, it is unlikely that artists would have completed their tasks as piecework at home. Rather, the obligation to collaborate with multiple partners would have required that painters—or subgroups of painters, at least—convene in common spaces. These may be the very workshops that Monserrate saw when he visited the Mughal court at Fatehpur Sikri in 1580–1. The circumstances would change only a couple decades later under Akbar's son and successor Jahangir (r. 1605–27). Not only did Jahangir reduce the size of the manuscript workshop, but his much smaller-sized atelier, as it were, even travelled with him.[36] Although this subject is beyond the scope of the present essay, suffice to say that the significantly altered structure of the *kitabkhana* under Jahangir was paralleled by significant shifts in artistic practice and style.[37]

Conclusion

How the members of Akbar's massive manuscript workshop coordinated to produce such a large number of illustrations has been an abiding concern of art historians. In this study, I have adapted methods drawn from Digital Humanities and SNA to examine instances of artistic collaboration across three imperial manuscripts produced between circa 1582–88. The use of these

non-traditional approaches has enabled me to identify patterns of practice that were not readily visible before, namely the fluctuation in the membership of artist subgroups from one manuscript project to the next, the preponderance of weak over strong ties within the networks of collaborators, and the minimal role that familial relationships played in the formation of a courtly painting style. These findings might be said to have limited application to the extent that they pertain to the imperial workshop over less than a single decade and they address collaboratively executed paintings in heavily illustrated manuscripts, and thus exclude so-called *de luxe* manuscripts that bear a smaller number of independently produced illustrations. But the 1580s was a critically important period in the history of the imperial atelier as it saw the workshop personnel and number of projects multiply. The tasks to which this newly expanded workshop were put necessitated novel means of organization and collaboration—the subject of this study—which had untold, hitherto unacknowledged, effects on the formation of the Mughal painting style. The clear emphasis on the co-production of paintings in densely illustrated manuscripts—and recall that the marginal ascriptions draw further attention to these collaborative efforts—is reason also to re-evaluate the long-standing scholarly focus on select Mughal workshop artists as autonomous masters.[38]

This study also underscores the utility of Digital Humanities methods for the investigation of the Mughal imperial apparatus. I have here used information drawn from ascriptions to investigate the structure of the imperial manuscript workshop, but one can also imagine using these metadata to examine the possible role that religious affiliation may (or may not) have played in the management of manuscript project

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[36] See Susan Stronge, "Jahangir's Itinerant Masters," in *Indian Painting: Themes, History and Interpretations*, eds. Sharma and Kaimal, 125–35.

[37] Perhaps most significantly, given the subject of this essay, highly active and well-connected artists like L'al, Basavana, and Keshava Kalan do not appear to have found employment at Jahangir's court, although Basavana's son, Manohar—who had also worked in Akbar's atelier—did. Considering that each had worked for Akbar for decades, chances are they were well advanced in age (or deceased) by the time that Jahangir established his own workshop.

[38] For recent scholarship in this vein, see Pratapaditya Pal, ed., *Master Artists of the Imperial Mughal Court* (Mumbai: Marg, 1992); Asok Kumar Das, ed., *Mughal Masters, Further Studies* (Mumbai: Marg, 1998); Milo Beach, B.N. Goswamy, and Eberhard Fischer, eds., *Masters of Indian Painting, 1100–1900*, 2 vols. (Zurich: Artibus Asiae, 2011). For a critique of the master artist paradigm in the context of Akbar's painting workshop, see Yael Rice, ""A Flower from Each Garden": Contradiction and Collaboration in the Canon of Mughal Painters," in *Image-Object-Canon*, eds. Larry Silver and Kevin Terraciano (Los Angeles: Getty Research Institute, *forthcoming*).

subgroups. Analyzing the connections between artists who worked on similar types of illustrations—e.g., battle scenes or courtly audiences—across multiple manuscripts may also prove fruitful. One could also track the careers of individual artists, and clusters of artists, over the latter decades of Akbar's reign to determine more specifically *how* the Mughal atelier operated in an apprenticeship capacity. Among the other hypotheses to be tested is whether the structure and organization of the manuscript workshop was unique or, rather, indicative of a larger imperial paradigm. Further, to what extent did familial versus professional ties form the basis of working relationships within other populous administrative sectors (e.g., the military)? These queries await further analysis.