



INTRODUCTION

Introduction: Migration and Technological Circulations in the Early Modern World

Floris van Swet¹ and Rémi Dewière² 

¹Department of Humanities, Northumbria University, Newcastle, UK and ²Dipartimento di Scienze Storiche, Geografiche e dell'Antichità, Università degli Studi di Padova, Padua, Italy

Corresponding author: Floris van Swet; Email: floris.vanswet@northumbria.ac.uk

Abstract

Recent scholarship has emphasised the central importance of cultural contact and global knowledge circulation for technological innovation; however, this connection remains understudied in the global early modern world. This introduction highlights the importance of combining migration history and the history of technology to shed new light on the roles of migrants in technological innovation from the sixteenth to the early twentieth century. The seven articles presented in this issue offer a range of studies spanning four continents, encompassing a wide range of migrants. Gathered together, they outline the multitude of factors that allowed migrants to become integral parts of technological dialogue. Hence, this introduction presents the methodological and conceptual foundations to unearth the common processes that linked the migration-innovation nexus across the early modern world.

Keywords: Migration; Technology; Technological Circulation; Innovation; Early Modern

Introduction

Recent scholarship has emphasised the central importance of cultural contact and global knowledge circulations for technological innovation.¹ The role of mobile experts and carriers of codified and non-codified knowledge during the Industrial Revolution has been extensively researched.² However, except for a few significant examples, such as the Huguenots,³ the impact of migrants in the circulation of technological knowledge and skill in the global early modern period is still largely overlooked. From the Caribbean to Europe, and from Africa to East Asia, stories of migrants remain largely unknown when it comes to their influence on technological innovations and circulations.

This special issue sheds new light on the roles of migrants in technological innovation by providing a global perspective from the sixteenth to the beginning of the twentieth century.

¹ Maxine Berg, "In Pursuit of Luxury: Global History and British Consumer Goods in the Eighteenth Century," *Past & Present* 182 (2004), 85–142; Corinne Maitte, "Migrations et intégrations urbaines des verriers italiens en France, XVII–XVIII siècles," *Cahiers d'Histoire* 132 (2016), 25–44; Pamela Smith, ed., *Entangled Itineraries: Materials, Practices, and Knowledges across Eurasia* (Pittsburgh: University of Pittsburgh Press, 2019).

² Giorgio Riello, "Asian Knowledge and the Development of Calico Printing in Europe in the Seventeenth and Eighteenth Centuries," *Journal of Global History* 5:1 (2010), 1–28; Felicia Gottmann, ed., *Global Trade, Smuggling, and the Making of Economic Liberalism: Asian Textiles in France, 1680–1760* (Basingstoke, UK: Palgrave, 2016).

³ For example, see Erik Hornung, "Immigration and the Diffusion of Technology: The Huguenot Diaspora in Prussia," *American Economic Review* 104:1 (2014), 84–122.

Through a focus on the circulation of technological knowledge and skill, especially in terms of the embodied and tacit skills of diverse mobile actors, this special issue demonstrates that the history of early modern technological innovation cannot be told without migrants. Moreover, through varied approaches, each contribution within this special issue not only highlights that migrants carried with them embodied forms of knowledge and skill, but also examines how they adapted this to different contexts. As made clear through the diverse contexts discussed, this could entail a complex interplay of migrant entrepreneurship, state support, economic and environmental factors, and social and trade networks. By bringing together historians with different geographical and methodological expertise, the aim of this volume is to highlight the common processes in the migration-innovation nexus across the early modern world.

Unearthing Migrants in the History of Technology and Skill

In studying the role of migrants in the circulation of technologies in the early modern period historians are often presented with particular methodological challenges. First, there are few written sources from migrant artisans, skilled workers, experts, workmen, and soldiers and sailors themselves concerning their forms of practice.⁴ Not only were these actors not necessarily literate, but some of those that were would have likely destroyed their professional and personal records in order to ensure ownership over some of their knowledge.⁵ Moreover, much of the skill and knowledge possessed by these diverse migrants was embodied and passed down orally.⁶ The scarcity of primary, written sources is even more apparent while looking at case studies outside of Europe, as in the Pacific World or the African continent. Additionally, migrants, as often subaltern groups, were frequently absent from and written out of official documentation, or had their stories distorted. Migrants were often not identified as such, but as traders, vagrants, or pirates; non-Europeans or women would be likely erased from historical narrative, described as passive, or reduced to unskilled workers, in particular in the colonial context.⁷ The contributors to this issue have therefore read along the archival grain of sources, such as court archives, enslaved people's petitions, colonial reports, illustrations, or hospital records, and drawn upon a range of interdisciplinary approaches and methodologies to unearth on-the-ground processes of technological dialogue and innovation.⁸

The second difficulty lies in the tension between micro and macro approaches. Studying the role of migrants in technological innovation leads us to explore the networks and global connections through migrant trajectories. However, the technological practice is deeply rooted in the local; it takes place within the home, on the street, behind the closed doors of the workshop, and the construction yard. This is because, whilst the people centred in these case studies are often mainly defined by their movement, it is important to remember that the exchanges of knowledge and skill took place in situ.

⁴ Paola Bertucci, "Spinners' Hands, Imperial Minds: Migrant Labor, Embodied Experience, and the Failed Transfer of Silk Technology across the Atlantic," *Technology and Culture* 62:4 (2021), 1003–31, 1005.

⁵ Paola Bertucci, *Artisanal Enlightenment: Science and the Mechanical Arts in Old Regime France* (New Haven, Conn.: Yale University Press, 2017), 2.

⁶ Francesca Trivellato, "Is There a Future for Italian Microhistory in the Age of Global History?," *California Italian Studies* 2:1 (2011); Francesca Trivellato, "What Differences Make a Difference? Global History and Microanalysis Revisited," *Journal of Early Modern History* 27:1–2 (24 March 2023), 7–31.

⁷ Jenny Bulstrode, "Black Metallurgists and the Making of the Industrial Revolution," *History and Technology* 39:1 (2023), 1–41.

⁸ Ann Laura Stoler, "Colonial Archives and the Arts of Governance," *Archival Science* 2:1 (2002), 87–109; Anne Gerritsen and Giorgio Riello, "Material Culture History: Methods, Practice and Disciplines," *Writing Material Culture History*, ed. Anne Gerritsen and Giorgio Riello (London: Bloomsbury, 2021), 1–19.

To deal with these tensions, most of the contributions in this special issue place themselves within a recent historiographical trend combining global circulations with individual biographies: global micro-history.⁹ Whilst the focus of global history has often been on models of globalisation, trade networks, and official relations, this more recent trend centres the diverse roles of individuals and “populat[es] models and theories with real people.”¹⁰ We therefore apply this approach to migrants and their experiences in order to identify common processes that facilitated the migration-innovation nexus, and examine what moving stories can tell us about something other than movement.¹¹ By applying these approaches, we can highlight the on-the-ground productive processes in these moments of encounter; processes that took place within a variety of contexts but exhibit common factors that led to innovation.

Early Modern Skill and Technology

This special issue focuses on the period from the mid-sixteenth to the early twentieth century, often broadly referred to as “early modern.” We recognise the difficulties in defining and delineating a period that would encompass in a single framework the complexities of the world.¹² We therefore define early modern, not in terms of chronology, but as a period of shared experiences, which took place globally though often at different periods and in different ways. It is therefore a period of transitions and revolutions, delimited by the integration of almost all societies to a common global market, ending with the prevalence of fossil-fuelled societies and Western colonisation.¹³ This period was defined by the formation of overseas empires, the development of diverse governance models, the emergence of transnational and transregional institutions and trading enterprises, the global intersection of technological innovation, and shifting migration patterns. This special issue has gathered articles which focus on the last two of these factors through a focus on the migration-innovation nexus.

The first of these, the global intersection of technological innovation, has been extensively studied.¹⁴ From market success and failures to domestic policies and institutions, and

⁹ Tonio Andrade, “A Chinese Farmer, Two African Boys, and a Warlord: Toward a Global Microhistory,” *Journal of World History* 21:4 (2010), 573–91; Francesca Trivellato, “Is There a Future for Italian Microhistory in the Age of Global History?,” *California Italian Studies* 2:1 (2011); John-Paul Ghobrial, “Introduction: Seeing the World like a Microhistorian,” *Past & Present* 242:14 (2019), 1–22; Leonard Blussé, “Three Men in a Boat? How the Suminokura, Caron, and the Zheng Experienced the Regime Changes in East Asia (1600–1670): An Essay in Global Microhistory,” *Itinerario* 45:2 (2021), 208–27; Maxine Berg, “Introduction: Global Microhistory of the Local and the Global,” *Journal of Early Modern History* 27:1–2 (2023), 1–5; Francesca Trivellato, “What Differences Make a Difference? Global History and Microanalysis Revisited,” *Journal of Early Modern History* 27:1–2 (2023), 7–31.

¹⁰ Andrade, “A Chinese Farmer, Two African Boys and a Warlord,” 574.

¹¹ John-Paul Ghobrial, “Moving Stories and What They Tell Us: Early Modern Mobility Between Microhistory and Global History,” *Past & Present* 242:14 (2019): 246.

¹² Erica Charters, Marie Houllemare, and Peter Wilson, “Introduction: Violence and the Early Modern World,” in *A Global History of Early Modern Violence*, ed. Erica Charters, Marie Houllemare, and Peter Wilson (Manchester: Manchester University Press, 2020), 2.

¹³ Jack Goldstone, “The Problem of the ‘Early Modern’ World,” *Journal of Economic and Social History of the Orient* 41:3 (1998), 251; Jean-Pierre Hirsch and Bertrand Chrétien, “Maîtriser le temps,” *Afrique & Histoire* 2 (2004), 25. See also Dennis Flynn and Arturo Giráldez, “Cycles of Silver: Global Economic Unity through the Mid-Eighteenth Century,” *Journal of World History* 13:2 (2002), 391–427; Jean-Laurent Rosenthal and R. Bin Wong, *Before and Beyond Divergence: The Politics of Economic Change in China and Europe* (Cambridge, Mass.: Harvard University Press, 2011); Kent Deng and Patrick O’Brien, “Establishing Statistical Foundations of a Chronology for the Great Divergence: A Survey and Critique of the Primary Sources for the Construction of Relative Wage Levels for Ming–Qing China,” *Economic History Review* 69:4 (2016), 1057–82.

¹⁴ Liliane Hilaire-Pérez and Catherine Verna, “Dissemination of Technical Knowledge in the Middle Ages and the Early Modern Era: New Approaches and Methodological Issues,” *Technology and Culture* 47, no 3 (2006), 536–65;

from particular knowledge regimes to the politics of external threat, the drivers of successful technological innovation have been variously identified in recent decades.¹⁵ Such approaches have often been premised on a teleological and macro-centred understanding of innovation. In the past decades, such interpretations have been challenged, as it has been shown that innovation rarely occurs as a singular event or eureka moment in the form of discoveries, claims, or patents, and it is therefore necessary to refocus the issue on “use” by looking at the practical application of technological skill and knowledge.¹⁶ Technological innovation and dialogue include numerous practices such as maintenance, repair, imitation, copying, and reverse engineering, and encompass various forms of knowledge.¹⁷ Innovation therefore does not simply occur in places of learning or in the mind of “great men” but stems from the everyday creative interaction between crafter and material.¹⁸ Within these interactions, crafters are reliant on embodied skills rather than any codified knowledge. These embodied skills are often overlooked, but allow people to perform difficult tasks with ease in the experience of the everyday, and allow artisans to practice their arts.¹⁹

Focusing on the human element—the artisan—and their embodied skills allows us to recentre the analysis on the individuals or groups who possess the expertise and practices that drive technological innovation.²⁰ Many of these actors or groups were highly mobile, which brings us to a second key factor: shifting migration patterns. As “knowledge is now understood to be constituted in part by movement,” both of and by the body, there is an increased need to integrate migrants, their movements, and their activities as a vital component of innovation.²¹

Taking as an analytical category the figure of the migrant to understand technological change allows us to show that technologies were inextricably parts of networks of exchange, materiality, institutional organisation, and other attendant factors, forming matrices rather than singular, individual strands, thereby recognising the crucial role of micro-adaptations, communities of practice, interactions, and wider social and environmental networks.²² It is through this focus on everyday, useful, embodied knowledge that

Nathan Rosenberg, “Economic Development and the Transfer of Technology: Some Historical Perspectives,” *Technology and Culture* 11:4 (1970), 550–75; Yokkaichi Yasuhiro, “Chinese and Muslim Diasporas and Indian Ocean Trade under Mongol Hegemony,” in *The East Asian Mediterranean: Maritime Crossroads of Culture, Commerce and Human Migration*, ed. Angela Schottenhammer (Wiesbaden: Otto Harrassowitz, 2008), 73–102.

¹⁵ Joel Mokyr, *The Lever of Riches: Technological Creativity and Economic Progress* (Oxford: Oxford University Press, 1990); David Landes, *The Wealth and Poverty of Nations: Why Some Are So Rich and Some So Poor* (New York: W. W. Norton, 1999); Avner Greif, *Institutions and the Path to the Modern Economy: Lessons from Medieval Trade* (Cambridge: Cambridge University Press, 2006).

¹⁶ David Edgerton, “From Innovation to Use: Ten Eclectic Theses on the Historiography of Technology,” *History and Technology* 16:2 (1999), 111–36.

¹⁷ Christian Jacob, *Qu’est-ce qu’un lieu de savoir* (Marseille: OpenEdition, 2014).

¹⁸ Elizabeth Hallam and Tim Ingold, “Creativity and Cultural Improvisation: An Introduction,” in *Creativity and Cultural Improvisation*, ed. Elizabeth Hallam and Tim Ingold (Abingdon, UK: Routledge, 2008), 1–24.

¹⁹ Tim Ingold, *Making: Anthropology, Archaeology, Art and Architecture* (Abingdon, UK: Routledge, 2013), 61–2.

²⁰ Bertucci, “Spinners’ Hands, Imperial Minds.”

²¹ Pamela Smith, “Nodes of Convergence, Material Complexes and Entangled Itineraries,” in *Entangled Itineraries: Materials, Practices, and Knowledges across Eurasia*, ed. Pamela Smith (Pittsburgh: University of Pittsburgh Press, 2019), 5.

²² Patrick O’Brien, “The Micro Foundations of Macro Invention: The Case of the Reverend Edmund Cartwright,” *Textile History* 28:2 (1997), 201–33; Lissa Roberts, Simon Schafer, and Peter Dear, eds., *The Mindful Hand: Inquiry and Invention from the Late Renaissance to Early Industrialization* (Amsterdam: Koninklijke Nederlandse Akademie van Wetenschappen, 2007); Morgan Pitelka, *Handmade Culture: Raku Potters, Patrons, and Tea Practitioners in Japan* (Honolulu: University of Hawai’i Press, 2005).

we can see the importance of migrant agency and integrate them and their wider activities as a vital component of technological and knowledge circulations.²³

What we show with this wide chronological range of case studies is that the processes driving and driven by the migration-innovation nexus remain the same in a time before the advent of a “modern” world and the active differentiation between science and craft.²⁴ Much of what we now consider science was in fact rooted in artisanal practice or guided by “artisanal epistemology.”²⁵ Within this reframing, technology is not simply transferred from one place or person to another, but is rather an inherently multidirectional, technological dialogue.²⁶ What drives technological change is not merely the circulation of technology itself, but the “friction”—here understood as the productive interaction between migrant skills and new political, social, environmental, and cultural contexts—through which technologies are adapted, improvised, or transformed in motion.²⁷

Early Modern Migration

Compared to the large-scale migration of the twentieth century, migration during the early modern period was characterised by a comparatively limited movement of people.²⁸ However, migrants played a major role in the long-distance circulation of technologies, as human movement was, and often remains, the most effective way for knowledge, skill, and techniques to travel and circulate.²⁹ Broadly understood as the movement of individuals or groups and their settlement in a given territory, whether forced or deliberate, for substantial periods of time,³⁰ migration is crucial to such processes of innovation, circulation, and dialogue.³¹ Much in the way that literacy studies has increasingly acknowledged the need to study not only the highly literate, the history of technology too has opened the field to non-experts as vital for technological innovation.³² This therefore not only encompasses the movement and activities of so-called experts but also takes into account the productive movement of any individual or groups who contributed to technological dialogue through their experience of migration. In this special issue we therefore combine the influences of

²³ Arnold Pacey and Francesca Bray, *Technology in World Civilization: A Thousand-Year History, Revised and Expanded Edition* (Cambridge, Mass.: MIT Press, 2021); Harry Collins and Robert Evans, *Rethinking Expertise* (Chicago: University of Chicago Press, 2007); Ingold, *Making*; Hilaire-Pérez and Verna, “Dissemination of Technical Knowledge in the Middle Ages and the Early Modern Era”; Hallam and Ingold, “Creativity and Cultural Improvisation: An Introduction.”

²⁴ Bertrand Gilles, *The History of Techniques, Volume 2: Techniques and Science* (New York: Golden and Bridge Science, 1986), 973; Pamela Smith, “The Codification of Vernacular Theories of Metallic Generation in Sixteenth-Century European Mining and Metalworking,” in *The Structures of Practical Knowledge: Toward Early Modern Science*, ed. Matteo Valleriani (New York: Springer, 2017), 371–92.

²⁵ Roberts, Schafer, and Dear, *The Mindful Hand*; Pamela Smith, *The Body of the Artisan: Art and Experience in the Scientific Revolution* (Chicago: University of Chicago Press, 2004).

²⁶ Pacey and Bray, *Technology in World Civilization*.

²⁷ On friction, see Anna Tsing, *Friction: An Ethnography of Global Connection* (Princeton, N.J.: Princeton University Press, 2024).

²⁸ Jan Lucassen and Leo Lucassen, “The Mobility Transition Revisited, 1500–1900: What the Case of Europe Can Offer to Global History,” *Journal of Global History* 4:3 (2009), 354.

²⁹ Patrick Manning, *Migration in World History* (New York: Routledge, 2005).

³⁰ Rémi Dewière, “Migration and Innovation in Early Modern Islamic Societies. The Case for Firearms,” *History Compass* 21:5 (2023).

³¹ Donna Gabaccia, “General Introduction,” in *The Cambridge History of Global Migrations: Volume 1: Migrations, 1400–1800*, ed. Cátia Antunes and Eric Tagliacozzo (Cambridge: Cambridge University Press, 2023), 1–17.

³² Richard Rubinger, *Popular Literacy in Early Modern Japan* (Honolulu: University of Hawai‘i Press, 2007); István György Tóth, “Une société aux lisières de l’alphabet: La paysannerie hongroise aux XVIIe et XVIIIe siècles,” *Annales. Histoire, Sciences Sociales* 56, no 4 (2001), 863–80.

a wide variety of actors: from Caribbean enslaved people to Mandinka roofers, and from Dutch refiners and second-generation Huguenot glass workers to Japanese smugglers.

The history of technologies has therefore increasingly acknowledged the important role of circulations, not only within Europe and between Europe and “the rest” of the world, but especially outside Europe.³³ More broadly, much work has been done on migration, and more recently major contributions have examined the long history of migration from a global perspective, from the early modern to modern periods.³⁴ Through this literature, the drivers and motivations of migration have been shown to be numerous:³⁵ from the independent movement of migrants to state-encouraged migration, from forced migrations to refugees, and organizational migration.³⁶

The categories and experiences through which migrants moved were varied and fluid, and therefore need to be critically assessed, in particular because of the relative silence of their voices in the documentation. How did these migrants refer to or identify themselves? What terms, such as “artisan” and “master,” were meaningful to the particular contexts in which they worked? Who applied such labels and why? The case studies presented here explore such questions by examining groups and individuals who adapted or changed categories over the course of their lifetimes. Indeed, as has been widely demonstrated, migrant communities themselves are subject to constant change, be they sojourner or diasporic communities, or “integrated” into their host environment.³⁷

To understand these shifting, dynamic, and diverse experiences and practices of migrants in the early modern period, it is necessary to examine not only direct accounts and contexts of their skilled work but also their wider social lives. Contributors to this special issue have therefore drawn upon traces of matrimonial alliances, family trajectories, training and formation, entrepreneurial strategies, and non-professional skills in order to understand how knowledge and techniques have spanned individual and familial life courses and to reinscribe migrant agency. In doing so they explore, for example, whether second- and third-generation migrants in England and Scotland were identified, or self-identified, as migrants; whether enslaved people in Jamaica were able to actually benefit from their skills; and in what ways networks and institutions, whether based around religious institution, place, “ethnicity,” or family, such as Chinese migrant networks across southeast Asia, acted as drivers and conduits of migration and the exchange of ideas, skill,

³³ Tonio Andrade, Hyeok Hweon Kang, and Kirsten Cooper, “A Korean Military Revolution? Parallel Military Innovations in East Asia and Europe,” *Journal of World History* 25:1 (2014), 51–84; Tonio Andrade, *The Gunpowder Age: China, Military Innovation, and the Rise of the West in World History* (Princeton, NJ: Princeton University Press, 2016); Gábor Ágoston, “Firangi, Zarbzán, and Rum Dasturi: The Ottomans and the Diffusion of Firearms in Asia,” in *Şerefe: Studies in Honour of Prof. Géza Dávid on His Seventieth Birthday*, ed. Pál Fodor, Nándor Kovács, and Benedek Péri (Budapest: Hungarian Academy of Sciences, 2019), 89–104; Sanjay Subrahmanyam, “Between Eastern Africa and Western India, 1500–1650: Slavery, Commerce, and Elite Formation,” *Comparative Studies in Society and History* 61:4 (2019), 805–34.

³⁴ Francesca Trivellato, Leor Halevi, and Cátia Antunes, eds., *Religion and Trade: Cross-Cultural Exchanges in World History, 1000–1900* (Oxford: Oxford University Press, 2014); Cátia Antunes and Eric Tagliacozzo, eds., *The Cambridge History of Global Migrations. Volume 1: Migrations, 1400–1800* (Cambridge: Cambridge University Press, 2023).

³⁵ Lucassen and Lucassen, “The Mobility Transition Revisited, 1500–1900,” 347–77.

³⁶ Paul Lovejoy, *Transformations in Slavery: A History of Slavery in Africa* (Cambridge: Cambridge University Press, 2011); Leo Lucassen and Aniek Smit, “The Repugnant Other: Soldiers, Missionaries, and Aid Workers as Organizational Migrants,” *Journal of World History* 26:1 (2015), 1–39.

³⁷ Abner Cohen, “Cultural Strategies in the Organization of Trading Diasporas,” in *The Development of Indigenous Trade and Markets in West Africa: Studies Presented and Discussed at the Tenth International African Seminar at Fourah Bay College, Freetown, December 1969*, ed. Claude Meillassoux (London: Oxford University Press, 1971), 266–78; Philip D. Curtin, *Cross-Cultural Trade in World History* (Cambridge: Cambridge University Press, 1984); Francesca Trivellato, *The Familiarity of Strangers: The Sephardic Diaspora, Livorno, and Cross-Cultural Trade in the Early Modern Period* (New Haven, Conn.: Yale University Press, 2009); Hornung, “Immigration and the Diffusion of Technology”; Steven Miles, *Chinese Diasporas: A Social History of Global Migration* (Cambridge: Cambridge University Press, 2020).

and knowledge. Within such processes, however, how does one distinguish between success and failure, and who is the judge of such assessments? Even seemingly perfect conditions for the circulation of technological knowledge and skill could see enterprises fail. One of the key abilities of migrants was therefore to adapt their skills and/or knowledge to their new environments. This could take many forms and spanned adaptations to raw materials, social hierarchies, markets, tools, and practices.

Migrants, Authority, and Agency

What is also shown by each contribution in this special issue is that it is vital to attend to the relation between local, national, and global politics and the migration of skilled workers. Specifically, many of the articles examine the central role political authorities played in facilitating or impeding human mobilities, and the impact this had on the circulation of technologies. From 1500 to 1900, these politics were influenced by a multitude of actors involved in various form of organisations, such as cities, states, empires, and colonial powers. In particular, empires often promoted, enforced, and controlled the movement of people between different parts of the world.³⁸ Vast maritime and land empires such as that of the Portuguese, Spanish, Ottomans, Bornoans, Chinese, or French were therefore very much concerned with controlling mobilities and managing workforces.³⁹ With the rise of modern colonial empires, this control intensified and mobility became increasingly intra-imperial. Many attempts were made to bring experts from both the “metropole” and “periphery” to particular colonised regions in order to increase extraction and promote productivity.⁴⁰

Not only did rulers use coercion in their attempts to obtain skilled individuals and knowledge, but numerous states conversely provided sponsorship and rewards for those willing and able to migrate with their skills in order to set up and support certain industries or reform their military organisation.⁴¹ In places such as Africa and Asia, as much as in Europe, rulers relied on migrant entrepreneurs.⁴² Whilst some of these entrepreneurs had certain skills and technical knowledge themselves, others were able to organise the migration of

³⁸ Andrew Thompson, “Introduction,” in *Writing Imperial Histories*, ed. Andrew Thompson (Manchester: Manchester University Press, 2013), 10; David Lambert and Peter Merriman, *Empire and Mobility in the Long Nineteenth Century* (Manchester: Manchester University Press, 2020), 3.

³⁹ Jeffrey Herbst, *States and Power in Africa: Comparative Lessons in Authority and Control* (Princeton, N.J.: Princeton University Press, 2000); James C. Scott, *The Art of Not Being Governed: An Anarchist History of Upland Southeast Asia* (New Haven, Conn.: Yale University Press, 2009); Gábor Ágoston, “The Ottomans: From Frontier Principality to Empire,” in *The Practice of Strategy: From Alexander the Great to the Present*, ed. John Andreas Olsen and Colin S. Gray (Oxford: Oxford University Press, 2011), 105–31; Rémi Dewièr, *Du lac Tchad à La Mecque: Le sultanat du Borno et son monde (XVIe-XVIIe siècle)* (Paris: Éditions de la Sorbonne, 2017); Katja Tikka, Lauri Uusitalo, and Mateusz Wyżga, eds., *Managing Mobility in Early Modern Europe and Its Empires: Invited, Banished, Tolerated* (Cham, Switzerland: Springer Nature, 2023).

⁴⁰ Suraiya Faruqi, *Artisans of Empire: Crafts and Craftspeople under the Ottomans* (London: I. B. Tauris, 2009); Karolina Hutková, “Transfer of European Technologies and Their Adaptations: The Case of the Bengal Silk Industry in the Late-Eighteenth Century,” *Business History* 59:7 (2017), 1111–35; Bartolomé Yun-Casalilla, “Social Networks and the Circulation of Technology and Knowledge in the Global Spanish Empire,” in *Global History and New Polycentric Approaches*, ed. Manuel Perez Garcia and Lucio De Sousa (Singapore: Springer Singapore, 2018), 275–91.

⁴¹ Sussan Babaie, Kathryn Babayan, Ina Baghdiantz-McCabe, and Massumeh Farhad, eds., *Slaves of the Shah: New Elites of Safavid Iran*, (London: I. B. Tauris, 2004), 99; Wolfgang Holzwarth, “Bukharan Armies and Uzbek Military Power, 1670–1870: Coping with the Legacy of a Nomadic Conquest,” in *Nomad Military Power in Iran and Adjacent Areas in the Islamic Period*, ed. Kurt Franz and Wolfgang Holzwarth (Wiesbaden: Reichert, 2015), 273–354; Ágoston, “Firangi, Zarbzán, and Rum Dasturi.”

⁴² Felicia Gottmann, ed., *Commercial Cosmopolitanism?: Cross-Cultural Objects, Spaces, and Institutions in the Early Modern World* (Abingdon, UK: Routledge, 2021).

skilled workers, be it within the borders of a political entity or across the borders of countries and empires.⁴³ In these contexts, political authorities often actively encouraged the transmission of skills and knowledge from migrants to local workers.

Despite the interests and involvement of authorities, however, the circulation of some technologies circumvented state or colonial control. The agency of migrants was central to the processes of technological dialogue and innovation. Migrants tried to keep their market advantage by avoiding state involvement and therefore limiting the diffusion of their skills, or looked after new markets, by passing the authorities' control through smuggling or non-authorised migration.⁴⁴ Conversely, imperial, colonial, and state authorities also put measures in place themselves to block technological circulation, regulate mobilities, and counter the smuggling and selling of material, knowledge, and people. The arrival of new skills and techniques in a given context could therefore create diverse relations and tensions between local economic actors, commercial and artisanal institutions, and political authorities.

Born out of a conference as part of the UKRI-FLF project "Migration, Adaptation, Innovation: 1500–1800" led by Felicia Gottmann at Northumbria University, this volume builds on recent work in migration studies and science and technology studies to unearth the factors that allowed for migrants to become integral parts of technological dialogue. By bringing together historians with different geographical expertise, the aim of this volume is therefore to highlight the common processes in the migration-innovation nexus across the early modern world.

Contributions

In "Genoese Migration and Technological Transfer in the Early-Modern Spanish Monarchy," Catia Brilli examines the role of Genoese workers and entrepreneurs in the development of different manufacturing sectors in the early-modern Spanish monarchy. Through a comparison between migrants who settled in the cities of Cadiz and Buenos Aires, this work demonstrates that the institutions of the Spanish Crown tended to encourage immigration of foreigners, especially those who practiced craft, retail, or mechanic professions. Through a consideration of the institutional framework and socio-economic conditions of the host societies in the Spanish peninsula and in the Spanish Americas, Brilli assesses the different contribution of Genoese migrants to the productive system of the Spanish monarchy. In doing so, this article shows that the particular social conditions and state policies in these two cities necessitated different strategies and adaptations for migrant settlers.

The relation between state and migrant is also extensively explored in Nicholas McGee's "Networks vs. the State or 'All Under Heaven'? Chinese Migrants, Technology Transfer, and Early Modern Qing Empire." By focusing on the interactions between migrants and the Qing state, it shows that the Qing state repeatedly found it necessary to concede autonomy and authority to migrant networks to make its own border system function. In doing so, McGee demonstrates the important impact that these interactions had on shipbuilding techniques in Siam, and mining and cash crop technologies throughout Southeast Asia. This contribution therefore highlights that the Qing Dynasty came to accommodate for these migrants within its expanding visions of universal emperorship, and that state efforts to

⁴³ Felicia Gottmann, *Global Trade, Smuggling, and the Making of Economic Liberalism: Asian Textiles in France 1680–1760* (London: Palgrave MacMillan, 2016).

⁴⁴ Corine Maitte, "Artisan Mobility and the Circulation of Knowledge in the Glass Industry in Early Modern Europe," in *The Republic of Skill*, ed. David Garrioch (Leiden: Brill, 2022), 65–89; Francesca Trivellato, "Murano Glass, Continuity and Transformation (1400–1800)," in *At the Center of the Old World: Trade and Manufacturing in Venice and the Venetian Mainland, 1400–1800*, ed. Paola Lanaro (Toronto: Centre for Reformation and Renaissance Studies, 2006), 146.

regulate shipping, taxation, and even attire had both promoting and inhibiting impacts on the application of migrant skill.

In Massimo Bomboni's "Sugar, Salt, and Mills for the Grand Duke: Dutch Trade and Technological Innovation in Early Seventeenth-Century Livorno," we see an example of active state support in order to attract skilled migrants. By examining the role of Dutch entrepreneurship in the development of the port of Livorno in the early seventeenth century, Bomboni shows that favourable laws enticed foreigners from all over Europe and beyond to settle, work, and trade in Livorno. Through the analysis of three case studies, Bomboni shows the ways in which early modern merchants acted as international entrepreneurs and promoters of the diffusion of new technologies and new goods between distant markets. What this study highlights, however, is that such state support does not necessarily guarantee longevity of migrant ventures and that wider social, economic, and political circumstances can determine success or failure.

The impact of wider circumstances on the application of migrant knowledge and the adaptations that are required is further explored in Thomas Monaghan's 'The Diffusion of Sugar-Making Knowledge in the East China Sea: Japan, Amami, and Ryukyu, 1609–1868' explores how sugar technology – both the know-how of cultivating sugarcane and the technical process of converting it into sugar crystals – reached and spread throughout early modern Japan. In doing so Monaghan highlights the centrality of Satsuma domain, which was able to take advantage of Chinese agricultural knowledge and technological micro-revolutions from the Ryukyu Kingdom through its control of the Amami islands in the 1690s. Through a comparison between the vast differences between the creation and characteristics of sugar production in Satsuma (where this created almost colonial relations) and Shikoku (where state support drove the creation of industry), Monaghan demonstrates the importance of official support and attendant factors on the creation of industry and the transfer of knowledge.

The article "Building and Developing Western-Style Cities: The Influence of European Architecture and Urban Planning in Senegambia, 1659–1854" by Cheikh Sene further explores these issues within the context of Senegambia. By taking a *longue-durée* approach, Sene shows how different colonial actors played a role in the circulation of architectural technology in the region. Significantly, Sene illustrates that the gradual process of urban transformation in the towns of Gorée and Saint-Louis resulted from a hybridisation of techniques that integrated European architectural styles and urban planning principles with local environmental and material constraints, facilitated through the collaboration of European architects and African masons. In doing so, this chapter analyses the success and limits of the technical contribution of European entrepreneurs on the economic, political, and cultural evolution of Senegambian societies, showing that the active importation of knowledge and skill by the colonial powers did not assure success. Central, therefore, are the importance of the inherently multidirectional nature of technological dialogue, and the consideration of on-the-ground factors.

Graham Kerr's "The 'King's Negroes': Enslaved Workers in Royal Navy Yards in the Eighteenth Century" further explores the circulation of knowledge within the unequal context of empire through a focus on the intersection of technological dialogue and enslavement. This paper looks at the activities of a particular group of enslaved people in British naval yards and focuses on which skills were taught, what knowledge was shared, and who benefitted from such transfers. Starting with the 1730s plan by the Royal Navy in Jamaica to train enslaved people in shipyard activities, this paper highlights the circulation of knowledge and skill that occurred globally at sea and in yards of the British Navy. This paper therefore explores the value and importance of skill and knowledge for those in bondage through assessing how they were able to leverage their position as skilled workers by looking at their living and working conditions within the naval yard.

This focus on the workshop floor, though under very different conditions, is continued in Oliver Gunning's article, "Migrant Innovation: The Movement of Glass-Making Knowledge in Early Modern Britain," as this paper takes us to a consideration of migrant skill and knowledge in the context of glass-making in the British Isles. Between 1560 and 1800, many skilled glass-workers migrated from Europe to the British Isles with the goal of producing new consumer products. Though they brought with them new techniques, tools, and management processes, they were forced to adapt those to their new surroundings. By examining exactly how these skilled workers arrived in the British Isles and the role of entrepreneurs in facilitating the transfer of their knowledge, Gunning demonstrates that the application of migrant skill creates innovation by applying existing processes to new material, social, and political circumstances.

Lastly, Takahiro Yamamoto's contribution, "Japanese Settlers' Introduction of Dynamite to Truk in the 1890s," also highlights the micro-interactions that constituted the circulation of technology. Through a focus on the illicit activity that took place on the borders of empire, this article shows the relations between the Japanese introduction of dynamite to the Pacific Island of Truk (now Chuuk) and wider global flows of this then new explosive. By centring this new explosive technology, Yamamoto shows how the sale of dynamite to Truk islanders resulted in its unforeseen use for dynamite fishing and intercommunal conflicts. This article therefore reveals how migrant entrepreneurship could be conditioned by global flows of technology and how illicit entrepreneurial activities of a handful of Japanese had far-reaching effects on the adaptation and implementation of new materials in the Pacific.

Together these eight pieces therefore foreground the importance of migrants in the circulation of skill and knowledge throughout the early modern world. By taking a global micro-historical approach, this special issue shows not simply that migrants were important in such processes, but *how* the circulation of technological knowledge and skill actually took place on the ground. By putting these articles together, it becomes possible to ascertain the conditions and circumstances that allowed for the effective circulation of technology and skill as well as pinpoint issues that obstructed both circulation and the success of migrants themselves.

Acknowledgements. We are very grateful to the anonymous reviewers for their constructive comments and suggestions.

Funding statement. This research was funded through the UKRI-FLF project 'Migration, Adaptation, Innovation: 1500–1800' [MR/T043091/1]. No new data was generated during this study. Sources analysed are listed in the footnotes.

Floris van Swet is a historian of early modern East Asia with a focus on Japan. He received his PhD in History and East Asian Languages from Harvard in 2019 and was Postdoctoral Research Associate at Yale. He is currently a Postdoctoral Research Fellow at Northumbria University as part of the UKRI 'Migration, Adaptation, Innovation' project. His research focuses on the relation between migration and technological change in Asia, and on the importance of rural semi-elites in the creation of the Tokugawa state.

Rémi Dewière is lecturer in medieval and early modern history at the University of Padua. His research investigates the intersection of technology, environment, mobility, writing and politics in West Africa, with a specific focus on the Borno sultanate (north-east Nigeria) and its extensive connections across the Sahel, Sahara, and Mediterranean world. His work further explores migration and technological dialogue within the early modern Islamicate world, analyzing how the hybridization of firearm technologies and the adaptation of military expertise facilitated innovation across religious and cultural boundaries.

Cite this article: Floris van Swet, and Rémi Dewière, "Introduction: Migration and Technological Circulations in the Early Modern World," *Itinerario* (2026): 1–10, <https://doi.org/10.1017/S016511532610059X>