



**Northumbria
University**
NEWCASTLE



Felicia Gottmann

Migration, Adaptation, Innovation 1500-1800

UKRI Future Leaders Fellowship (£1.2m)

2021-2025

Project Overview

Summary

Today, when mass migration coincides with a high skill economy's ever-growing need for constant technological innovation, the project's central question is burning: what makes for successful immigration, technological innovation, and knowledge transfer? The effective management of these three permitted Europe to first industrialise. Global knowledge transfers and the migration of skilled practitioners have been crucial for innovation and technological improvement in general and in particular for the 'Great Divergence', the process by which Europe overtook Asia as the world's manufacturing centre. This project focusses on this vital period of shifting balances.

Case studies have shown both that skilled migration can strengthen or even birth new industries (think of the Huguenots bringing silk weaving to England and Prussia, or immigrant and first-generation Jews founding and running Hollywood) and that, to establish new technologies and manufactures, entrepreneurs and governments need to involve experts, often from abroad. This could be voluntary: in the eighteenth century Hyder Ali and Tipu Sultan of Mysore attracted French and Ottoman experts in weapons technology and instrument making, while, as Gottmann's research has shown, French officials invited groups of Indian and Levantine cotton weavers to develop the French cotton industry. But it wasn't always a matter of choice. Many artisans came as refugees and some were expressly kidnapped: Japan's porcelain industry in and around Arita only took off after the enslaving of skilled ceramics craftsmen during the invasions of Korea in the 1590s, sometimes referred to as 'the Pottery Wars'.

Such case studies however remain local and situation specific. To come to broad conclusions about which factors influenced the success or failure both of the integration of expert migrants and of the diffusion of their skills and products, we need systematic globally-comparative and interdisciplinary studies.

This is what this project offers. Building on Gottmann's interdisciplinary work in global history, notably her internationally-recognised monograph that features the project's pilot study, it combines economic history, migration studies, science and technology studies, and material culture. It sets out to investigate the conditions for, and obstacles to, the successful application and diffusion of the knowledge and skills brought by immigrant experts in the early modern world, specifically including non-elite, non-European, and female migrants. In order to evaluate the relative importance of technical, material, institutional, economic, socio-cultural, and personal or locational factors, it will concentrate on the most inventive manufacturing industries of the time which had close ties both to formal scientific enquiry and to state-support schemes in an age when nascent industrialisation coincided with interstate rivalries: textiles, ceramics, instrument making, and weapons technology. Comparative across time and space it will contrast case-studies from Europe and its colonies (PI), the Middle East, South and East Asia (two postdocs) in the period before Western hegemony: 1500 to 1800.

Next producing co-authored papers, articles, a monograph, and an edited volume of essays based on the international project conference ('Migration and Expertise: 1500 to the present day'), the team will work with its museum and community organisation partners to foster a broader debate about the value of immigrant skills. We will run a series of outreach, policy, and knowledge exchange events with current migrants and we will work with our partner museums to run teacher training events, develop resources for visitors, families and educators, and both contribute to their galleries and curate our own virtual exhibition on the project website.

Objectives

RATIONALE:

Migration and technological innovation are two of the greatest challenges and opportunities we face. They are inextricably linked. Both cause immense popular anxiety, threatening democratic rule and social cohesion. Yet both have been indispensable for economic growth. They are linked in another way, too: migration encourages innovation. A truism in migration studies, this is slowly recognised in science and technology studies (STS). Despite numerous case studies, we lack comparative long-term studies about this connection. This project offers the first globally comparative study of skilled migration covering the origins of industrialisation and modern economic growth.

OVERARCHING OBJECTIVE:

Combining interdisciplinary methods (economic history, STS, migration studies, and material culture) with a globally comparative approach, this project will transcend the local and situation specific to identify the mechanisms underpinning the success and failure both of the integration of the migrant and the adaptation and diffusion of his or her skills and outputs in the past, allowing us to draw important parallels with, contrasts to, and guidelines for the present. Through work with community organisations, museums, teachers, and academics from different disciplines these findings will have a broad impact.

RESEARCH QUESTIONS:

- 1) Which factors contributed to the integration of the migrant?
- 2) Which factors contributed to the success of their outputs?
- 3) Which factors contributed to the adaptation and diffusion of their skills?
- 4) (How) Were migration and innovation linked?
- 5) What was the contribution of migrants to 'The Great Divergence', the process in which Europe for the first time in history replaced Asia and the Middle East as the economic centre of the world?

AIMS:

Building on her internationally-recognised interdisciplinary work in global history, Gottmann will lead a team of two postdocs working on the three most important world regions in technological and manufacturing terms: Europe (PI), the Middle Eastern and South Asian Islamic Empires (postdoc 1), and the 'Sinosphere' (South East and East Asia, postdoc 2). They will be joined by a Northumbria-sponsored PhD student working on a smaller study of the British Isles. Together they will:

- 1) Bring together existing case studies in the 3 regions (WP1: 3 survey articles).
- 2) Develop new insights based on archival and material research: 3 case studies on 4 focus areas (textiles, ceramics, instrument making, & weapons technology), investigating 4 factors: technological & material; institutional & economic; sociocultural & spatial; and actor-networks; (WP2: 3 articles for a Journal of Global History Special Issue & 1 PhD thesis);
- 3) Identify cross-regional and cross-temporal commonalities (WP3: co-authored journal article for the American Historical Review; edited volume based on international conference; PI's monograph).

The project will involve its partners (TOP, Bowes Museum, German Museum of Technology, Oriental Museum, and TWAM) at every stage to maximise stakeholder input & impact (WP 4). Together we will develop:

- 1) Material culture training and case studies for WP2&3
- 2) Themed visitor guides
- 3) Workshops with migrants to feed into:
- 4) Website with virtual exhibition and
- 5) Exhibitions at Oriental and Discovery Museums
- 6) Teachers and migrants workshop.
- 7) PGCE training day.

- 8) Policy paper.
- 9) Public international final conference.

In the final three years (WP5) Gottmann will consolidate the project's legacy into an interdisciplinary, multi-institutional, outreach-focussed 'Connected History Centre'. Building on her existing partnerships and work as founder and coordinator of NETWoRC, an inter-institutional research initiative in transnational history, this will establish her as an international research leader and allow the less connected North East of England to become a beacon of best practice in cross-sectoral collaborations.

Academic beneficiaries

The project models the future of history as a discipline: interdisciplinary and global in scope but with a clear local grounding and the continued involvement of stakeholders outside of academia: museums, community organisations, and teachers.

ADVANCING KNOWLEDGE

The project will set a milestone in the development of global history. The question about the origins of ‘The Great Divergence’, between the industrialising West and the Global South, or about the ‘The wealth and poverty of Nations’ gave birth to global history as a discipline (Landes 1998, Gunder Frank 1998, Pomeranz 2000). Since then the analysis has become more nuanced taking into account the role of knowledge cultures, artisans, state capacity, and political economy (Parthasarathi 2011, Vries 2015, Ashworth 2017). However, despite both the emphasis on the vital role of cultures of knowledge and technology and the realisation that most early modern technology was embodied and hence required the movement of experts, migration has so far been marginalised as a factor in these debates. This project will mark a milestone in our understanding of the Great Divergence, the role of migration in technological change and innovation, and of what makes for the success and failure of immigration and knowledge transfer.

SHAPING BEST PRACTICE

In order to remain relevant in the modern world historians need to embrace new ways of working. This project will help drive this change. For scholars to be able to answer big questions as those posed by this project, the research needs to be both truly collaborative and interdisciplinary. Genuine teamwork is central to this project. This guarantees a truly global picture and free from Eurocentric bias. By launching the careers of two postdocs and a PhD student and by perpetuating and broadcasting its approach in the shape of a new Connected History Centre (CHC), the project will contribute to train a new generation of historians and place Gottmann as one of the leaders of disciplinary change.

INTRODUCING NEW METHODOLOGIES IN INTERDISCIPLINARY AND TRANS-SECTOR WORKING

Collaborative work is central to the project, but so is its interdisciplinary methodology which brings into dialogue different disciplines within academia and experts from beyond it. The project’s innovative methodology combining Science and Technology Studies, economic history, and material culture studies, with sociological and ethnographic insights from migration studies, will be promoted across academic disciplines via high-profile publications and trans-sector workshops and its conference, hosted by the German Museum of Technology in Berlin. Gottmann will further develop her leadership in this thanks to her background in literature and critical theory (DPhil), her training in economic and global history (postdoc) and experience in collaborative working and publishing across disciplines and sectors, with museum curators, art historians, literary scholars, sociologists, philosophers of science, and economists. She will be mentored by a steering group made up of world-leading scholars in these field, who will support her in communicating across academic divides. The project’s legacy, the CHC will continue to promote innovative historical practice.

DEVELOPING THE SECTOR

The CHC will serve two purposes. 1) Conferences, networking events and workshops will promote the project’s best practice: collaborative team work across disciplines and sectors; stakeholder engagement, knowledge exchange, outreach, and a genuinely global, non-Eurocentric approach with local grounding. 2) It will provide the infrastructure allowing the North East of England with its distinct industrial heritage to become a globally recognised centre of interdisciplinary historical excellence and outreach, on par with Oxford’s TORCH, Cambridge’s CRASSH, or London’s Raphael Samuel Centre.

Impact Summary

Anxieties about rapid technological change and fears about the negative impact of migration have damaged social cohesion, democratic governance and the economy not only in the UK but globally. They have also significantly worsened the psychological and social situation of immigrants exposed to a newly 'hostile environment'. This project sets out to change perceptions of immigration. Longer-term perspectives that demonstrate the historic prevalence of migration and its positive impacts can help ease anxieties and concrete case studies can bring this overall abstract narrative to life and demonstrate its relevance to individual lives. From its inception the project will thus engage with the wider public not only through media interventions and its own website, but through more concrete targeted dissemination and engagement via its ongoing collaborations with third sector organisations, all the while contributing to an active knowledge exchange with, and capacity building of, these organisations themselves.

MUSEUM AND HERITAGE SECTOR

The project relies on its close partnership with TWAM, the German Museum of Technology (DTM), the Durham Oriental Museum and the Bowes Museum which are central to our research. In regular meetings with our collaborating curators we will develop a series of 'object stories' that will feature in targeted guides for visitors, in the virtual exhibition we will develop out of our conference, and in the Oriental Museum's 'Silk Road' and TWAM's Discovery Museum 'Destination Tyneside' galleries which we will help redesign in collaboration with our community partners. Our collaboration with the DTM will engage an international public with our research and offer them new insights into our partners' collections.

COMMUNITY ORGANISATIONS

We are partnering with TOP, The Other Perspective, a community interest organisation working to foster the economic inclusion of migrants. Together we will develop case studies that highlight current migrants' economic and social contributions. These stories will then feature on our website and in our partner museums' guides and exhibitions. Knowledge exchange will culminate in a workshop at the Discovery Museum, highlighting migrants' (historic) contribution to British and global society. In collaboration with TOP we will devise a policy paper and media interventions to highlight our findings about which factors have historically contributed success and failure both of the integration of the migrant and the adaptation and diffusion of his or her skills and outputs.

EDUCATORS

Young people are key to changing narratives and perceptions. Targeting families, primary and secondary teachers we aim to engage pupils with the positive role of migrants in the past through interacting with the objects they created. In collaboration with our partner museums we will run a one-day teacher training workshop at the Oriental Museum and develop guided tours and trails, family and educator packs with teaching materials and holiday activities that can be downloaded from our website or used to run activities and onsite. Our Discovery Museum workshop will bring teachers in conversation with migrant.

WIDER PUBLIC

The public interest in establishing what makes for successful immigration, technological innovation, and knowledge transfer is beyond doubt. Through our engagement with teachers, museum visitors, and workshop and conference participants we will address a broad cross-section of the population. We intend to widen this by disseminating our findings, again in collaboration with our partner organisations, through the publication of a policy paper, our website, and media interventions, notably on world refugee day.

Project Partners

- Bowes Museum, Barnard Castle (Jane Whittaker)
- Durham Oriental Museum (Rachel Barclay)
- German Museum of Technology, Berlin (Maria Borgmann)
- TOP – The Other Perspective, Middlesbrough (Biniam Araia)
- TWAM –Tyne and Wear Archives and Museums (Lizzy Baker)

Academic Advisory Board

- Julia Adams (Professor of Sociology and International and Area Studies, Chair Heads of College Council and Co-Director CHESS, Yale University)
- Mareile Flitsch (Chair of Social Anthropology, Museology and Chinese Anthropology, University of Zurich and Director of the Ethnographic Museum, University of Zurich)
- Giorgio Riello (Chair of Early Modern Global History, European University Institute, Florence)
- Dagmar Schäfer (Director, Max Plank Institute for the History of Science, Berlin)
- Simon Schaffer (FBA, Professor of History of Science, University of Cambridge)

Project Details

Rationale

What makes for successful immigration, technological innovation, and knowledge transfer? In an age characterised both by mass mobility and today's high skill economy's ever-increasing need for constant technological innovation, the question is vital. The successful management of these three factors had originally permitted Europe to industrialise and overtake Asia as the manufacturing centre of the world economy. This project will hence focus on the crucial period of this 'Great Divergence' to answer these pressing questions.

Recent scholarship has emphasized the central importance of cultural contacts and global knowledge transfers for innovation and technological improvement in general and for the Great Divergence in particular (McNeill 1991, Manning 2005, Parthasarathi 2011, Riello 2013, Vries 2015). Revisionist work by historians of science has dismantled the old opposition between elite science and artisanal practice, between the 'hand' and 'the mind', and instead brought a new understanding of the materiality of knowledge, of 'embodied skills' and the 'mindful hand' of often highly mobile skilled workers. We now know that such knowledge could only successfully travel in an embodied form: that is it could only be transmitted through the movement of experts themselves (Roberts, Schaffer et al. 2007, Klein and Spary 2009). The logical connection between the two findings must therefore be skilled migration; yet we lack broad and systematic studies of the technological impact of skilled migrants in this period. This is what this project will provide.

Building on her internationally-recognized interdisciplinary research, Felicia Gottmann and her team will investigate how skilled migration in the early modern period contributed to the transfer of new technologies, the development of new practices, objects, and fashions, and what factors hampered and impeded such innovations. By taking a globally comparative approach, the project will transcend the local and situation-specific to identify the mechanisms underpinning the success and failure both of the integration of the migrant and the adaptation and diffusion of his or her skills and outputs in the past. This will allow us to draw important parallels with, contrasts to, and guidelines for the present.

Research Questions:

- 1) Which factors contributed to the integration of the migrant?
- 2) Which factors contributed to the acceptance and profitability of their outputs?
- 3) Which factors contributed to the adaptation and diffusion of his or her skills?
- 4) (How) Were migration and innovation linked?
- 5) What was the contribution of migrants to 'The Great Divergence'?

Methodology

Such a study must take a multidisciplinary approach, combining traditional economic history with migration studies, science and technology studies (STS), and global material culture. There is excellent research on diasporic communities and networks, and both 'Big History' and the newly developing field of global microhistory have revolutionized our understanding of early modern global mobility. Such studies have not, however, been greatly concerned with the transfer of skills and knowledge. By contrast, work in the field of economic history and the history of science and technology has stressed the importance of 'industrial espionage', and the systematic gathering of useful knowledge (Harris 1998, Hilaire-Pérez 2000), without paying sustained attention to migration.

STS has developed sophisticated insights into cultures of innovation in general (Nowotny 2006) and the role of actor-networks and materiality in particular (Latour 2005). The flourishing new field studying cultural brokers, mediators, and go-betweens has provided the requisite methodologies to study the translation, adaptation, and co-production of technical knowledge (Raj 2007, Schaffer, et al. 2009). The heritage sector and the newly emerging field of global material culture studies meanwhile have begun to develop insights into how cultural contacts shaped new materials, techniques, fashions, and objects (Gerritsen and Riello 2016). While neither of these schools is primarily concerned with migration, their combination provides the necessary methodological tools to study its technological and material

impact. Gottmann demonstrates this in chapter four of her recent monograph, *Global Trade, Smuggling, and the Making of Economic Liberalism: Asian Textiles in France 1680-1760* which investigates the transfer and development of cotton technologies in early modern France.

Research Design

This project will provide the first globally comparative evaluation of the migration and settlement of ‘non-elite’ skilled migrants, specifically including female, non-white and non-European actors in the early modern world, providing answers to the still burning questions: what makes immigration, innovation, and knowledge transfer successful, and what stands in the way of such success?

CHRONOLOGY AND GEOGRAPHY

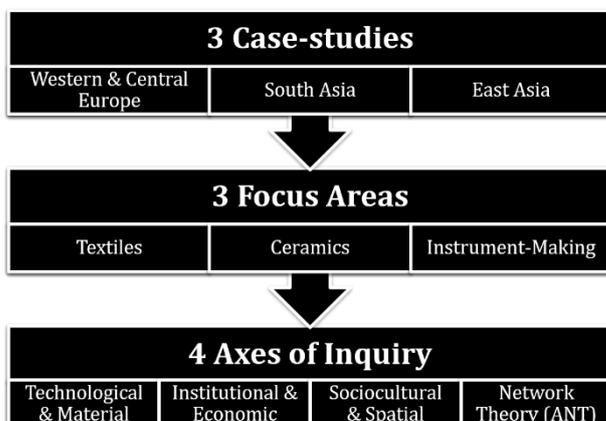
The 300 years leading up to the Napoleonic Wars in Europe and beyond are a crucial period: they built up to and saw the Industrial Revolution and ‘Great Divergence’ during which the world economic and manufacturing centre moved from India and China at the beginning of the period to Europe by the end of it. Nevertheless, this was not yet an era of European predominance. A focus on this period therefore allows for a truly global approach and valuable comparisons, no longer possible in the later centuries of Western imperial and economic hegemony. By 1500 China had developed many of the technologies that would characterise Europe’s later predominance: gunpowder and the compass, printing, and a proto-industrial manufacturing sector characterised by a high degree of division of labour, for instance in the famous porcelain kilns of Jingdezhen (Finlay 2010). Long before Britain, India produced cotton textiles on a broad spectrum of prices and qualities, customised to suit sophisticated consumer tastes in Europe, the Americas, Africa, and East Asia (Riello 2013). Before Europe could rival Chinese porcelain or Indian Cotton production, it needed significant technological catch-up. Other commonalities stand out: both Europe and India but also the Safavid, Ottoman, and Mughal empires were characterised by intense inter-state competition in which respective governments actively encouraged innovation in the sciences, technology, and manufacture, most notably through inviting (or capturing) skilled experts from abroad (Parthasarathi 2011). Both Europe and China developed distinct cultures of scientific thinking and technical writing as ways of authorizing technology as a legitimate field of scholarly concern (Schäfer 2011). The three regional case studies will thus be Central and Western Europe (PI), the so-called ‘Sinosphere’ of East and Southeast Asia (postdoc 1), and the great Islamic ‘gunpowder’ Empires: Safavid, Ottoman, and Mughal (postdoc 2).

FOCUS AREAS

The project will focus on four of the most innovative industries of the period: textiles, ceramics, armaments manufacturing, and watch or instrument making. Textiles were economically the most important part of the early modern manufacturing sector, and one that continued to expand and innovate throughout the period, becoming, in the guise of cotton manufacture, one of the mainstays of the Industrial Revolution. Like textiles, ceramics, armament manufacture, watch and instrument making

expanded throughout the period, required highly skilled workers and saw high levels of technical innovation. These industries were of central importance for the scientific, military, and industrial revolutions, and their highly skilled practitioners were much sought-after by competing states. State and individual entrepreneurial efforts to attract such experts lead to increased levels of mobility, whilst conversely workers in these industries when faced with religious or political persecution at home found it easier to move abroad. The four areas saw genuinely global knowledge exchange in this period: French and Ottoman weapon-smiths and instrument makers moved to India, Korean porcelain makers to Japan, Chinese potters to the Safavid Empire, and, as Gottmann’s own work has demonstrated, Indian and

Levantine weavers moved to France (Habib 2008, Finlay 2010, Gottmann 2016).



Furthermore, textiles in particular had a very diverse workforce: many spinners and weavers were women, and, as Gottmann has shown, women were also amongst those who migrated, invented and taught new skills. Finally, all three sectors maintained close links with the 'official' scientific establishment (Hilaire-Pérez 2000, Mokyr 2009, Parthasarathi 2011, Schäfer 2011). This makes them particularly suited to the explorations of connections between migration, skilled practice, scientific institutions, and technological innovation, as well as between these and the diffusion and implementation of such innovation.

AXIS OF INQUIRY

The project will investigate the relative importance of different factors reflecting its interdisciplinary methodology. The factors to be investigated across the three regional studies and four focus areas will be: the technical and material; the institutional and economic; the sociocultural and the spatial; the role of actor networks. Contrasting the findings with each other it seeks to answer the following questions: firstly, relating to technical factors, under what conditions was know-how successfully integrated into the wider economy? Were economic success, technological innovation and the diffusion of new techniques positively related or did they harm or preclude each other? How could migrants and associated agents translate, adapt, and creatively fashion new knowledge to suit local circumstances and thereby co-produce new skills, understandings, and objects? To investigate this the team will collaborate with its museum partners to study both production processes and, crucially, the actual material objects produced. This material culture aspect, often ignored by traditional historians of science and economics, is vital: it will permit the team to connect technological innovation to economic and social success by taking into account fashion and taste regimes and the adaptation of techniques, objects, aesthetics, and functions to suit local conditions and preferences.

The second area of inquiry concerns economic and institutional factors. Recent scholarship has stressed the crucial role of the state in fostering economic growth and technological development (Parthasarathi 2011, Vries 2015, Ashworth 2017). Both economic historians and historians of science have also pointed to the importance of social networks of knowledge, of correspondence and informal associations as well as clubs, academies, and learned or improvement societies with which skilled migrants often had or established close links (Hilaire-Pérez 2000, Latour 2005, Mokyr 2009). Next to broader issues such as infrastructure, the level of training and education of the available workforce, guild structures and patent law, the team will carefully investigate the role of institutions, networks and public and private initiatives respectively: were success rates different between state-sponsored and private enterprises? How important was it whether the migrant or migrants set up their own concern or became part of a local public or private enterprise?

The socio-cultural and spatial factors that could facilitate or hinder both the integration of the migrant and the diffusion of his or her skills will be of special concern and form the third broad area of investigation. Next to gender, these include both the religious, linguistic, ethnic, and social background of the migrant and the respective situation of the host society. Carefully distinguishing between prevailing discourses, official legal frameworks and actual practice on the ground, the team will establish the relative importance of pre-existing multi-ethnic communities or structures of religious tolerance. The recent 'spatial turn' has demonstrated the importance of locational factors and the team will evaluate the relative roles of rural or urban settings and spatial segregation or integration both domestic and work-wise.

Finally, this project will study those whom traditional history mostly ignores, that is manual workers, immigrants, and women, but also objects and technologies themselves. The project team will apply methodological advances in STS, most notably Actor-Network-Theory (ANT), which accords agency not only to conscious actors, but also to mediators such as objects and technologies themselves (Latour 2005), an approach whose fruitfulness in this context has been demonstrated in Gottmann's work.

The technical and material, the institutional, economic, sociocultural, spatial, and actor-network aspects of each of the three case studies, will enable us to establish the first comprehensive picture not

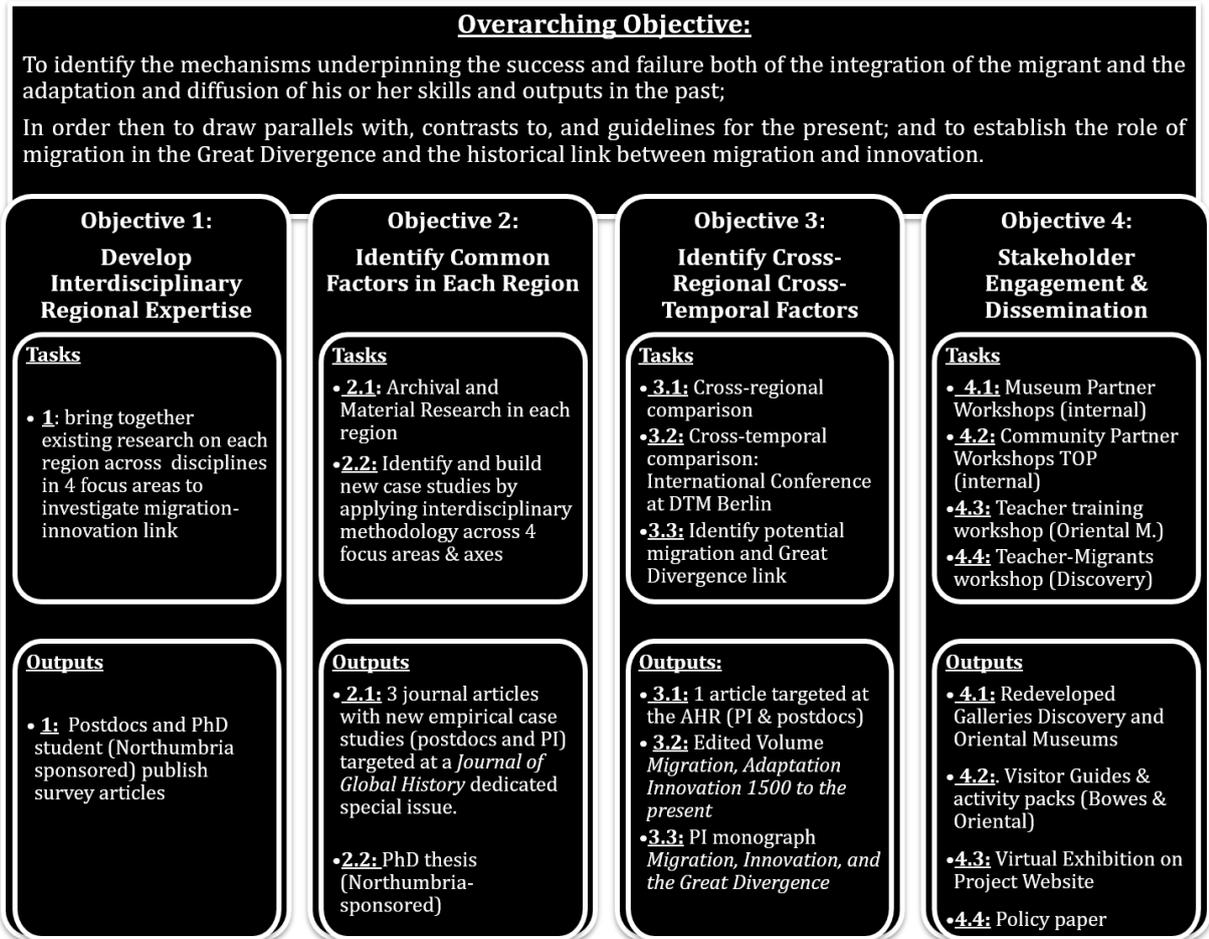
only of what was necessary to the success of skilled migration and product or process innovation, but also of the broader impact these had on the technological, economic, and cultural development of host societies.

Aims & Objectives

The project's overarching objective is to identify the mechanisms underpinning the success and failure both of the integration of the migrant and the adaptation and diffusion of his or her skills and outputs in the past, allowing us to draw parallels with, contrasts to, and guidelines for the present. This will then allow Gottmann to address the broader question about the role of migration for the Great Divergence and the link between migration and innovation.

WP 1

To achieve this the project will be divided into five research objectives and work packages (WPs). In the initial phase each team member will consolidate their expertise by compiling the fragmented existing research in different cogent disciplines (economic history, heritage and



curatorial research, STS, migration studies) to establish potential links between skilled migration and the development of textile, ceramic, instrument making, and armament manufacturing in their respective region. These findings will be diffused in the shape of three journal articles each: one each by the postdocs and one by the Northumbria-University sponsored PhD student who will work on a smaller case study of the British Isles.

WP 2

In stage two this work will be deepened by extensive archival research combined with collaborative material-object research with our museum partners. This will allow each team member to assemble a number of new empirical case studies, which, when investigated comparatively, will reveal the common factors contributing to or impeding the success of the integration of migrants and the diffusion of their skills and outputs. These findings will be published in three articles (one each by the PI and postdocs) that will be submitted to the *Journal of Global History* as a dedicated special issue, and in the form of a PhD thesis by the Northumbria-sponsored student.

WP 3

The regional findings will then form the basis for cross-temporal and cross-regional comparisons to identify which factors held true across both space and time. The results of which will be communicated via a co-authored article targeted at the *American Historical Review* and the international Project Conference held at the German Museum of Technology in Berlin. This conference will bring together museum curators and academics from STS, History and Philosophy of Science, Economics, Sociology, Anthropology, Modern Languages and Literature, as well as History, working on historical and contemporary migration and technology exchange, who we will invite to collaborate on a volume co-edited by the PI and postdocs.

Gottmann will then develop these findings into a monograph that links them to the wider question about the link between migration, innovation, and the Great Divergence which she will submit to Cambridge University Press.

WP 4

We will communicate our findings not only through these events and publications but also through the public engagement and knowledge exchange activities outlined below under 'Impact'. Public engagement and stakeholder involvement are integral to the project and WP 4 will thus run parallel with our research activity.

WP 5

The final three years of the project will see the consolidation of its legacy in the shape of a new Connected Histories Centre which will model best practice in the field and permit the North East of England to develop an integrated cross-sectoral research, knowledge-exchange, and engagement infrastructure (see below under 'Career intentions').

Key References

- Ashworth, W. J. The Industrial Revolution : the state, knowledge and global trade (London, 2017)
- Finlay, R. The pilgrim art : the culture of porcelain in world history (Berkeley, Calif., 2010).
- Gerritsen, A. and G. Riello, Eds. The global lives of things : the material culture of connections in the early modern world (Abingdon, 2016)
- Gottmann, F. Global Trade, Smuggling, and the Making of Economic Liberalism: Asian Textiles in France 1680-1760 (Basingstoke New York, 2016)
- Habib, I. Technology in medieval India, c. 650-1750 (New Delhi, 2008)
- Harris, J. R. Industrial espionage and technology transfer: Britain and France in the eighteenth century (Aldershot, 1998)
- Hilaire-Pérez, L. L'invention technique au siècle des Lumières (Paris, 2000)
- Klein, U. and E. C. Spary, Eds. Materials and expertise in early modern Europe: between market and laboratory (Chicago, 2009)
- Latour, B. Reassembling the social: an introduction to actor-network-theory (Oxford, 2005)
- Manning, P. Migration in world history (New York, 2005)
- Mokyr, J. The Enlightened Economy : an Economic History of Britain, 1700-1850. New Haven, 2009)
- Nowotny, H. Cultures of technology and the quest for innovation (Oxford, New York, 2006)
- Parthasarathi, P. Why Europe grew rich and Asia did not: global economic divergence, 1600-1850. (Cambridge, 2011)
- Raj, K. Relocating modern science: circulation and the construction of scientific knowledge in South Asia and Europe, 1650-1900 (Basingstoke, New Delhi 2007).
- Riello, G. Cotton: the fabric that made the modern world (Cambridge, 2013)
- Roberts, L., S. Schaffer and P. Dear, Eds. The mindful hand: inquiry and invention from the late Renaissance to early industrialisation (Amsterdam, 2007)
- Schäfer, D. The crafting of the 10,000 things : knowledge and technology in seventeenth-century China (Chicago, 2011)

- Schaffer, S., H. O. Sibum, L. Roberts, K. Raj and J. Delbourgo, Eds. The Brokered World: Go-Betweens and Global Intelligence, 1770-1820 (Sagamore Beach, 2009).
- Vries, P. State, economy and the great divergence: Great Britain and China, 1680s-1850s (London, 2015)

Project Impact

Anxieties about rapid technological change and fears about the negative impact of migration have damaged social cohesion, democratic governance and the economy not only in the UK but globally. They have also significantly affected immigrants who face an increasingly hostile climate. This project sets out to change perceptions of immigration. Longer-term perspectives that demonstrate the historic prevalence of positive impacts of migration across the whole of Eurasia can help ease anxieties while concrete case studies can bring this overall narrative to life and demonstrate its relevance to individual lives.

To achieve this, Gottmann has mapped out clear pathways to impact, targeted at a range of different audiences. While academic rigour is key to the project and the collaboration with and dissemination to different academic disciplines is central, our collaborations with third sector organisations are of equal importance both to our research and to our impact strategy. From its inception, the project engages with non-academic audiences not only through media interventions and its own website, but through more concrete targeted dissemination and engagement via our ongoing collaborations with museums and community organisations.

The project models the future of history as a discipline: interdisciplinary and global in scope, it engages with stakeholders outside of academia who actively shape the project: museums, community organisations, and teachers. Its central question has clear contemporary relevance and aims at impacts far beyond the sector. In academia, it will not only significantly advance our knowledge in key debates in the humanities, social sciences, and science and technology studies, but also promote new methodologies and ways of interdisciplinary and trans-sectoral collaborative working

Academic

Our research will bridge different academic disciplines and its interdisciplinary international advisory board will help the team maintain the highest standards in order to learn from and address these separate academic communities effectively. The board is made up of world-leading scholars of global material culture, sociology, ethnography and museum studies, area studies, and the history and philosophy of science in Europe and Asia. This will allow us to organise a truly interdisciplinary final project conference. Hosted by the German Museum of Technology in Berlin, this will place our research questions firmly in the present day while also disseminating them to a broad interdisciplinary audience of scholars, museum specialists and the wider public (WP 3.2).

Unlike the better connected Golden Triangle and Midlands region of Britain, the North East of England has fewer well-established centres that encourage multi-institutional, interdisciplinary, transsectoral and outreach-focussed collaborations across the humanities and social sciences, as for instance in Oxford's TORCH, Cambridge's CRASSH, or London's Raphael Samuel Centre. The project models such an approach and its legacy, the eventual development of a 'Connected History Centre' (CHC), will institutionalise its collaborations, innovative approach and methodologies, to provide a regional beacon of best practice (WP5).

Migrant and Refugee Community

Fears about unregulated immigration and sensationalist reporting of the 'refugee crisis' have shaped the current prevalent negative discourse about migration. In turn this has significantly worsened the psychological and social situation of immigrants exposed to an intentionally 'hostile environment'. By highlighting the positive contributions made by male and female and especially also non-European and non-Christian immigrants over several centuries, our project sets out to change perceptions. It will show that migration is an age-old and truly global phenomenon which can bring significant benefits to its host countries.

To this end we are partnering with TOP, The Other Perspective, a community interest organisation who work to foster the economic inclusion of migrants. Together we will develop case studies that highlight current migrants' economic and social contributions (WP4 task 2). These will then

feature next to the historical case studies we will develop. We will showcase them both on our project website in our partner museums' exhibitions (WP 4 outputs 1-3). Knowledge exchange activities with TOP will culminate in a workshop with teachers and migrants at the Discovery Museum to celebrate migrants' historic contribution to British and global society beyond the well-known narratives covering only the nineteenth and twentieth centuries in the West (WP4 task 4).

In collaboration with TOP we will also author a policy paper and launch media interventions to highlight our findings about which factors have historically contributed to success and failure both of the integration of the migrant and the adaptation and diffusion of his or her skills and outputs (WP4 output 4).

Museum collaborations

Material culture research is key to develop our case studies, as in many cases written records about technology transfer by migrants are non-existent, have been lost, or need supplementing. In return, our partners will benefit from our research into their collections and our ability to link them to broader historical themes.

For this purpose we are partnering with the German Museum of Technology (DTM) in Berlin, the Bowes Museum, the Durham Oriental Museum, and TWAM (Tyne and Wear Archives and Museums, which include the Tyne and Wear archives as well as amongst others the Discovery Museum, the Great North Museum Hancock, and the Laing and Shipley Galleries). We will, for instance, be able to make a significant contribution to the Oriental Museum's ongoing efforts to research its collections of historical weapons, but also to link the Tyne and Wear archive holdings on technology transfer and migration and to TWAM's material collections. Our partnerships will allow us to feature our research in the Oriental Museum's newly designed 'Silk Roads' galleries and the Discovery Museum's 'Destination Tyneside' galleries, and to develop themed guides and activity packs for the Oriental and Bowes Museum (WP4 output 1).

We will be able to bring our partner organisations together to maximise impact. Thus our global findings over the *longue durée* will feature together with current and local stories and objects from current migrants in the newly developed Oriental and Discovery Museum galleries but also in themed museum guides, family activity and teacher packs that we will develop for the Bowes Museum (WP4 output 2).

Our public-facing final conference, 'Migration, Adaptation, Innovation 1500 to the Present' will be held in the DTM in Berlin. This will bring our work to international attention and allow us to link past and present experiences and also to connect these to the Museum's collections. This will be reflected in our website's virtual exhibition and in the conference's edited volume (WP3.2)

Educators

Education and young people are key to changing perceptions and with help from our museum and community partners we will work closely with teachers and educators to facilitate this. Our website and newly developed onsite guides and trails will feature dedicated resources for teachers, which we will develop in consultation with them. To this end we are also hosting two dedicated events to facilitate classroom engagement with material culture and to encourage teachers to make use of our and our partner museums' resources. Our teacher-migrants event at the Discovery Museum will highlight their collections, our contribution to their galleries, and the case studies we have developed in our archival and material culture research and in our work with TOP (WP 4 task 4). Additionally we will host a one-day workshop for teachers-in-training at and with the Oriental Museum to introduce PGCE students to material culture methods, the Museum's resources, and our wider findings on the role of migration in shaping new objects and technologies (WP 4 task 3).

Wider Public & Public Policy

Through these targeted interventions we will also be able to engage the wider public: through classroom teaching, museum guides, activities and trails, exhibitions, and new objects and stories in the existing galleries. We will also welcome the general public to our final project conference and regularly update our social media profile and project website which will feature a virtual exhibition of historic and contemporary profiles of migrants, their objects, and technologies (WP4 output 3).

In collaboration with our partners we will seek to engage the media and policy makers. In conversation with our community partners Gottmann will write a policy paper for *History and Policy* (WP4 output 4). Having already received intensive media training provided by Hot Seat, Gottmann will engage with mainstream media through her tenure as a Future Leaders Fellow to showcase our findings, which will not only highlight the contributions made by migrants in the past but which will allow us to identify the mechanisms underpinning the success and failure both of the integration of the migrant and the adaptation and diffusion of his or her skills and outputs in the past, so that we can then draw parallels with, contrasts to, and guidelines for the present.