Opening Pathways, Building Bridges:
skilled migration and the case of Mexican scientists and engineers in the UK

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Declaration

I, Tonatiuh Anzures Escandón, confirm that the work presented in this thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

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Abstract

This study explores contemporary skilled migration and the brain drain from a bottom-up approach, based on a case study of Mexican scientists and engineers working in the UK. The main interest is to provide a better understanding on how the phenomenon is shaped by the migrant's personal and professional experience, from Mexico to the UK ('opening pathways'), and from then on, to explore the extent of collaboration at a distance (from the UK back to Mexico) as a policy alternative to mitigate the negative effects of their departure ('building bridges'). It is argued that these elements (personal and professional) of the migration experience are crucial for identifying key trends, characteristics, and effects of skilled migration, as well as to consolidate a more robust policy approach to long-distance collaboration.

The research is based on an analysis of 36 semi-structured, qualitative interviews with Mexicans graduated in STEM fields, who currently work in academia or the private sector in the UK. A complementary set of four interviews was conducted with Mexican government officials, chosen because of their close relationship to Mexican policies on skilled migration and the brain drain. The empirical findings are organised into three topics: transnationalism, professional experience, and collaboration at a distance. On the one hand, the evidence shows that the migratory experience fosters new subjectivities, where a transnational identity is developed progressively, involving reflexive processes between past and actual life, personal and professional experiences, different rationalities and emotions. On the other hand, under the theme of professional experience, career-related motivations emerge as the main "pull" factor of skilled Mexicans to the UK, triggered in most cases by enrolling in post-graduate programmes at British universities, and followed thereafter by the pursuit of work opportunities. In this process, the interviewees identified important imbalances (or asymmetries) between the development of scientific/professional fields in Mexico and the UK, mainly regarding budgets, infrastructure, networks, R&D activities, triple-helix collaborative schemes, and working conditions. However, despite these complex imbalances, more than half of the émigrés were also immersed in relevant collaborative initiatives with Mexico from the UK, which contests, to an extent, the notions of loss within the brain drain debate. It is also notable that such collaborations have taken place because of the personal initiative of the émigrés, with no involvement of the Mexican Talent Network (MTN), the main diaspora-engagement initiative of the government to contact its skilled émigrés around the world.

The thesis also investigates the relevance of these research findings for science policy. Without overlooking the negative implications of skilled migration at a massive scale, it argues that a more balanced exchange between Mexico and the UK can be achieved by building more bridges with the diaspora, through long-distance collaborative initiatives. For this to happen, it is important for policy-makers to understand the relevance of skilled individuals' choices and preferences, the value of communities of interest, the existing imbalances between central and peripheral countries, the role of legitimacy and politicisation in state-led transnational policies, and the challenges posed by long-distance collaborative initiatives. Finally, some ideas and policy recommendations arising from the research are outlined, in order to better understand –and face— the challenges of skilled migration in future years.

For Sebastián and Sofía,

You are the path
and the strength to walk it.

Always,
Papá

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ABBREVIATIONS AND ACRONYMS

Cinvestav	Centre for Research and Advanced Studies
Conacyt	Mexican Science and Technology Council
EPSRC	Engineering and Physical Sciences Research Council
HESA	Higher Education Statistics Agency
ICTs	Information and Communication Technologies
IT	Information Technologies
IME	Institute for Mexicans Abroad
INEGI	Mexican Institute for Statistics and Geography
IPN	Mexican Polytechnic Institute
MTN	Mexican Talent Network
MTN-UK	Mexican Talent Network, UK chapter
NINo	National Insurance Number
NTD	Neglected tropical diseases
ONS	Office for National Statistics in the UK
PPP	Purchasing Power Parity
R&D	Research and Development
SANSA	South African Network of Skills Abroad
SE	Mexican Ministry of Economy
SEP	Mexican Ministry of Education
SIRME	System of Registry for Mexicans Abroad
SNI	National System of Researchers
SRE	Mexican Ministry of Foreign Affairs
STS	Science and Technology Studies
TEC	Technological Institute of Monterrey
UNAM	National Autonomous University of Mexico

Chapter 1

Introduction

> *I feel quite nostalgic, of course. And now that I'm established here I see Mexico as something of the past. A place where I occasionally go on holidays, and despite having deep connections to my family, my work connections are very scarce; I don't collaborate with anyone in Mexico, in scientific terms. It's a country that's still sunk in deep trouble (…) And it's very personal to me, because I feel I abandoned the ship when I was supposed to collaborate. And even when to me my family comes first, there will always be that feeling of "you can not criticise, because you abandoned the ship" (...) is a bit of remorse, remorse about a country that needs a lot of education and I was working in education. That used to make me very happy, and I was very unhappy when I had to leave my role. I felt part of a structure, of a Mexico that wanted to progress. So leaving by my own choice, well that makes me unhappy (…) It's a personal decision, which I don't regret, by the way.*
>
> – *Quiquillo, Mexican researcher living in the UK*

Highly skilled migration is certainly not a recent phenomenon. Back in the seventeenth century, it is estimated that around 10% of the few university students were enrolled in universities from different countries than their birthplace, and by the end of the nineteenth century the movement of students towards German universities was well on its way (Kim 2009; Jöns 2015). The phenomenon grew to a massive scale in the 1920s, when the rise of the Nazi regime forced large groups of German Jewish scientists and intellectuals to abandon their country because of political persecution (Fleming and Bailyn 1969; Timms and Hughes 2003), and would be repeated with the exile of thousands of Spaniards –with a good number of highly-skilled and intellectuals among them—during the Spanish Civil War. These flows to other countries would later enrich local economies and education systems, and would contribute to modernisation and social change in their receiving contexts (Vailati and Rial 2016). However, these groups were up-rooted. For political exiles, leaving was not an option.

After the Second World War, many European countries –greatly affected by the devastation of World War II— experienced skilled migration in greater numbers. The phenomenon began to be considered as a potential threat in the UK, in 1963, when the *Evening Standard* coined the term "brain drain", that would be later used in the

House of Lords by the Minister of Science, Lord Hailsham, who derided the U.S. for 'parasitising' the British *Brains* (Godwin, Gregory, and Balmer 2009). Similar phenomena were taking place in Mexico and several countries of Latin America, where attempts to control emigration flows were greatly surpassed by the realities of the economic growth of the U.S. (Fitzgerald 2006). Ever since, skilled migration has been widespread around the world, and the concerns over the brain drain would constitute a matter of study for academics and international institutions, a recurrent topic in the media, and a complex issue to tackle for governments.

This study explores contemporary skilled migration and the brain drain from a bottom-up approach, based on a case study of Mexican scientists and engineers working in the UK. The main interest is to provide a better understanding on how the phenomenon is shaped by the migrant's personal and professional experience, from Mexico to the UK ('opening pathways'), and from then on, to explore the extent of collaboration at a distance (from the UK back to Mexico) as a policy alternative to mitigate the negative effects of their departure ('building bridges'). It is argued that these elements (personal and professional) of the migration experience are crucial for identifying key trends, characteristics, and effects of skilled migration, as well as to consolidate a more robust policy approach to long-distance collaboration. The thesis also outlines some ideas and policy recommendations arising from the research, in order to better understand – and face— the challenges of skilled migration in future years.

I develop my analysis from a combination of theoretical approaches from Science and Technology Studies (STS) and from migration studies, where the interest is placed on three main topics: i. Transnationalism and identity; ii. Professional experience; and iii. Collaboration at a distance. In this chapter, some of the main elements of this qualitative study are introduced, as well as the broad literature guiding the three topics chosen. From then on, the research questions and the design of the thesis are presented, and I finalise by acknowledging some of the limitations of this study, as well as the main definitional challenges surrounding the literature on skilled migration and the brain drain, which are taken into account to guide this study both conceptually and empirically.

The relevance of a qualitative perspective

One of the main arguments that motivates the debate on the brain drain is relatively simple: highly-skilled individuals DO make a difference in a country's welfare and economic development. It is estimated that, in 2010, around 28 million highly-skilled migrants (with at least one year of tertiary education) resided in OECD countries, an increase of 130% since 1990; by contrast, the flow of unskilled migrants grew only 40% during the same period of time (Kerr et al. 2016). This rise is the result of local conditions –both in sending and receiving countries— globalisation, modern science, unequal capabilities between labour markets, global cities, a growing flexibility (and instability) of employment, declining transportation costs, and importantly, because of various governments' efforts to attract and retain skilled individuals in a time of knowledge-based economies. Nonetheless, as Day and Stilgoe notice, some of the policy debates over globalisation give the impression that 'globalisation *happens to* people rather than *because of* them' (2009, 10). As a societal process, contemporary skilled migration appears as the result of a complex set of decisions that are shaped through different life experiences, taken by individuals for personal and professional reasons, under a vast number of circumstances. There is therefore a need for studies that contribute to understanding the circumstances under which these decisions to leave (and remain abroad) take place, how they are formed, why they change, and what they imply for both sending and receiving countries.

Mexico has been commonly known and studied for its vast migratory movements to the U.S. —mainly of unskilled workers, with a component of irregular migration[1]. However, the Mexican skilled diaspora also stands out as one of the largest in the world. As of 2013, it is estimated that more than 1 million Mexicans with undergraduate and post-graduate degrees lived abroad (Tuirán and Avila 2013; Delgado Wise et. al. 2015). Despite these estimates, to date there is very limited information about their precise number, locations, or occupations around the world.

[1] As McIlwaine and Bunge (2016, 8) note, the term 'irregular' describes people who enter and/or remain in a country without authority to do so, and are exposed to being deported. As the authors explain, however, this term is more suitable than 'undocumented' or 'illegal', as being less likely to assume that émigrés are criminals, or to avoid confusions over undocumented means not having legal papers or not being officially recorded by the receiving country. In the U.S., estimations on irregular migration are done on a regular basis.

Moreover, their paths, motivations, achievements, and potential contributions to Mexico at a distance are still underexplored. This study aims to fill this gap: through the lens of Mexican scientists and engineers in the UK, skilled migration is understood as a human experience with life paths and chronologies, in an attempt to transcend the accounts in tables and statistics (Stake 1995).

As will be shown, Mexican skilled migratory flows to the UK are significantly lower than those to the U.S. However, analysing smaller-scale case studies, like the present one, can contribute to analysing, with closer detail, some of the most significant complexities, differences, and transitions within contemporary skilled migration, particularly by analysing in-depth the migrant experience. For a long time, Mexican skilled migration in the UK has not been a relevant issue for policy-makers. However, this study argues that the composition of these migratory flows is valuable in many aspects (such as socioeconomic origins, levels of academic training, proficiency levels in the use of the English language, expertise, occupations, or contributions at a distance). For these reasons, it is possible to portray Mexican skilled migration in the UK as a case worth of an in-depth study.

The research is based on two different data collection methods: a corpus of 36 qualitative, semi-structured interviews with highly-skilled Mexicans graduated in the fields of Science, Technology, Engineering and Mathematics (STEM)[2] constitute the core of my analysis. All of my interviewees earned at least their undergraduate degree in Mexico, and have been working in academia or the private sector in the UK for at least two years. From the perspective of these sampling decisions, these émigrés are considered to be 'drained brains' from Mexico. A complementary set of four interviews was conducted with four government officials, chosen because their work is related to some extent with the issue of skilled migration and collaboration at a distance.

[2] According to the definitions by qualifications of the Joint Academic Coding System (JACS), used by the Higher Education Statistics Agency (HESA) and the Universities and Colleges Admissions Service (UCAS) in the UK (Mellors-Bourne, Connor, and Jackson 2011).

Transnationalism, professional experience and collaboration at a distance: a view from STS and migration studies

Albeit relatively distant to date, scholars have made efforts in the past to address skilled migration by bringing STS and migration studies' perspectives more closely. In 1997, *Science, Technology and Society* released a special issue titled *The International Mobility of Brains: Exodus or Circulation?* Its editorial acknowledged the brain drain as one of the most crucial issues facing the developing world, where migration was not solely due to economic or material reasons, but also because scientists tend to become isolated because of the lack of an appropriate climate for the constitution of scientific communities. This thesis aims to continue to establish more connections between both fields by exploring overlapping narratives that are pertinent for my case study, where my interest relied on approaching the phenomenon from three complementary perspectives: transnationalism, professional experience, and collaboration at a distance.

From a qualitative approach, my interest relies on exploring how the *Brains* experience skilled migration during their life paths. In this study, I constantly refer to these highly-skilled Mexicans as '*Brains*'[3]. Very early in my research I chose to call my interviewees this way, partly because of its strong symbolism in the brain drain debate, but perhaps more important than symbols, I chose to call them *Brains* because of their elevated levels of education, skills, and the relevance of their professional experience. This does not mean, however, that my only interest in them is on their role as 'knowledge carriers', as Jackson (2012) called them, but as will be shown, the richness of their accounts transcends professional aspects, and contributes to humanising the statistics.

My interest then is to explore transnationalism, professional experience and collaboration at a distance with an emphasis on the roles of the *Brains* as individuals, as professionals, and as subjects of diaspora-engagement policies.

Within the first aspect –the *Brains* as individuals— Transnationalism is used as the main conceptual framework, in order to investigate how individual (and in many cases,

[3] This study employs the terms '*Brains*', 'highly-skilled', or 'skilled émigrés' interchangeably.

couple or familial) decisions, motivations and rationalities to leave Mexico/to remain in the UK are shaped within the migration experience, as well as to discuss how the notions of identity and belonging (symbolically represented as *Mexicanhood*) are shaped and modified through time and distance. Until the 1990s, the role of skilled émigrés as individuals had received limited attention in migration studies, which were predominantly more focused in quantitative, long-scale approaches. Transnationalism was then used as a new conceptual framework, not to re-make theories of the causes of migration, but rather to expand our understanding of the migrants' experience (King 2012).

From numerous perspectives –from sociology, political science, economics, anthropology, history, human geography or psychology— migration studies have followed the evolution of skilled migration, from the notion of one-way migratory flows of the 'brain drain' (Grubel 1966; Portes 1976; Todaro 1985) to a more dynamic 'brain circulation' (Gaillard and Gaillard 1997; Iredale 2001; Saxenian 2005; Didou-Aupetit 2010). These transformations entailed new patterns of mobility, and migrants were seen to forge and maintain different relations –familial, economic, social, religious, or political— that connected their societies of origin and settlement in different ways (Glick Schiller, Basch and Szanton Blanc 1992; Portes 2001). From this perspective, transnationalism analyses these transborder activities (Appadurai 1996; Wimmer and Glick Schiller 2002; Vailati and Rial 2016), where the insertion of the *Brains* to their receiving context did not mean the assimilation of a common culture, but rather an acculturation process that grows in a deliberation between past and actual life (Harzig, Hoerder and Gabaccia 2009), and the notions of identity and belonging are thus problematised (Huppatz, Hawkins and Matthews 2016). In this study, skilled migration is observed as a human experience, and therefore considers the role of skilled émigrés as individuals of great relevance to provide new insights on how *Mexicanhood* is performed and negotiated in the receiving context, and how this relates to the increasingly blurred boundaries between the notions of being "home" or "abroad" that underlie the *Brains'* transnational skilled mobility, in times of globalisation.

The second aspect –the *Brains* as professionals— is of paramount relevance for this (and any other) research on skilled migration. The qualitative perspective of this study enables an in-depth analysis of the career paths, professional views and achievements of a Mexican migratory group that has been practically unexplored to date. As will be described, one of the requirements for choosing my interviewees consisted of them needing to be in employment at the time of the interview, as their occupations enable two complementary discussions. First, the traditional narrative of loss and negative effects within the concept of the brain drain –in this case, the departure of Mexican scientists and engineers implying a loss of their knowledge and skills— is contrasted to the realities of the migrant experience, that is, on the views of my interviewees as 'drained brains'. An effort is made to depict a contemporary understanding of skilled migration based on the main elements found in the empirical evidence, involving elements like the temporality of stay (where uncertainty plays a relevant role); the availability, quality and relevance of working opportunities in Mexico and the UK; and the global dynamics of contemporary labour markets.

From this contrast between *concept* and *experience* regarding the brain drain, the second discussion focuses on the *Brains'* current occupations, professional networks and achievements. By making use of the diverse characteristics of my sample (STEM-graduated scientists and engineers, working in academia and the private sector, conducting research and non-research activities in numerous fields of expertise), the objective is to know and analyse their perceptions about the different professional/scientific fields within which they work in the UK, as well as to identify key comparisons with the professional/scientific landscape in Mexico. Different notions from STS are employed to guide the analysis, as *following actors* has been one of its methodological preferences to understand science and technology in terms of their interactions with individuals and societies, where important elements for skilled migration and the brain drain are related to an on-going debate between what science *is* or *ought to be* (Kuhn 1962; Price 1963; Capshew and Rader 1992; Holden 2015). Such studies were motivated by changes in fundamental aspects of science that took place most significantly since the Manhattan project during the Second World War. As Hughes (2002) notes, these changes were: geographical (from a few countries to an

expanded activity worldwide), institutional (from research centres to a complex articulation involving academia, governments, industry, or the military), intellectual (with blurring boundaries and new frontiers of knowledge), economic (with science as valuable means for development), and scale (from small-scale science to Big and Mega science). However, as with any large-scale productive activity, science disperses geographically into clumps (Henke and Gieryn 2008), where the proximity of highly-specialised economic activities gives rise to particular regions, or 'global cities', with profound effects for skilled mobility, both within science and corporate capitalism (Sassen 2001). This approach also entails contested understandings of the *ethos* of scientists and engineers in modernity, whose professional identity has been contrasted between a special vocational 'call' based on their intellectual capacities (Weber 1958), or a 'moral equivalence'; in other words the assertion that they are human too (Seaborg 1996 [1955]; Shapin 2008), with the same shortcomings, expectations, and desires as anyone else to who migrates towards these privileged locations.

From these notions, it is argued in this study that STS can widen our understanding as to the issue of why scientists and engineers choose to leave their countries of origin in pursuit of better scientific/professional horizons. This thesis will then proceed to demonstrate how, for the 'drained brains', elements of satisfaction and self-fulfilment about career-related aspects contribute not only to explain mobility decisions, but also to identify harsh realities (portrayed in this thesis as 'imbalances') between the labour markets of two countries with very different levels of development, such as Mexico and the UK. From different approaches, STS and migration studies have drawn attention to the presence of such asymmetries as fundamental drivers of skilled migration. As Cozzens et. al. (2008) note, STS enables us to portray globalisation as a process of knowledge confrontations, where professional/scientific knowledge carries the privileges of the global North and shapes and influences the global South. These asymmetries (or imbalances) in knowledge production (Fuller 2003; Sismondo 2008) differentiate countries between the centre and the periphery, where power relations between advanced and developing economies influence the production and application of knowledge, predominantly in favour of advanced economies (Díaz, Texera and Vessuri 1983; Kreimer and Zavala 2006; Rodríguez Medina 2013).

The final aspect –concerning the *Brains* as subjects of diaspora-engagement policies— builds on from the findings of my interviewees' role as individuals and professionals, in order to discuss the extent of collaboration at a distance as a feasible policy alternative to mitigate the negative implications of their departure. From the policy perspective, many studies have elaborated on different understandings between skilled migration, skilled émigrés, and the role of nation-states. These studies have mainly focused on the 'return option' or repatriation (Meyer and Brown 1999; Tejada et. al. 2014); emigration –and restrictive emigration— policies (Grubel 1966; Bhagwati 1976 & 1979; Hugo and Stahl 2004; de Haas and Vezzoli 2011); and immigration policies (Iredale 1999; Cerna 2016). However, recent migration literature argues that skilled émigrés abroad can supply their countries with skills, knowledge, expertise and networks from abroad that cannot be generated locally, thus advocating for diaspora-engagement policies, or the 'diaspora option', for re-connecting them to their scientific/professional fields back home (Meyer and Brown 1999; Kuznetsov 2006; Rannveig Agunias 2009; Gaillard, Gaillard and Krishna 2015). In a similar perspective, this change of paradigm about the policy approach to the brain drain has been followed by a relatively recent term within STS and the scientific community, regarding the notion of scientific diplomacy (Elorza Moreno et.al. 2017; The Royal Society 2010a; AAAS 2009), which advocates for a growing influence of science in international relations and issues of global concern, and also addresses the potential role of scientific communities in facilitating broader institutional arrangements, via systematic collaborations.

Over the last two decades, diaspora-engagement policies have become one of the most important initiatives for nation-state outreach. In the case of Mexico, the Mexican Talent Network (MTN)[4] was created in 2005 with the goal of contributing to the Mexican inclusion in the world economy –through the support of skilled émigrés working in skilled jobs abroad—, as well as to promote links between Mexico and its skilled diaspora, in order to facilitate the creation of business, education and innovation developments (IME-FUMEC 2007).

[4] The Mexican Talent Network was re-named in 2016 to 'Red Global Mx'. However, I decided to keep the original name of the network in this thesis, as all of the interviews conducted referred to the MTN.

However, long-distance scientific/professional collaboration entails different challenges, and many of diaspora-engagement policy initiatives have ceased to exist, given their often centralised, top-down approaches, as well as their limited role in tackling such collaborations and the limited impact achieved (Gaillard, Gaillard and Arvanitis 2014; Gaillard, Gaillard and Krishna 2015). In the case of Mexico, additional challenges include the lack of empirical evidence on the performance of the MTN. To contribute to fill this gap, the bottom-up perspective of this study is used, firstly, to identify and analyse the experience of those *Brains* who are (or have been) engaged in long-distance collaborative initiatives with Mexico from the UK with the objective of identifying their main characteristics, conditions and outcomes, and from then on, to explore the role of the MTN in tackling such collaborations. In this part, the accounts of my interviewees are complemented by the views of the *Officials*, whose views contribute to portray a clearer picture on the main challenges for long-distance collaborative initiatives. From the policy perspective, this study resorts to the bottom-up approach to provide empirical evidence regarding the performance of the MTN, as well as to suggest recommendations to improve its performance in future years.

Skilled migration and the brain drain debate in Mexico: an overview

The migration of Mexicans *to* and *from* the U.S. throughout the last century confirms the assertion of Wimmer and Glick Schiller (2002, 218), on 'how transnational the world has always been'. It is the product of an intense bilateral relationship of 'asymmetric interdependence' (Keohane and Nye 1987) that started taking shape at the end of the nineteenth century, when tens of thousands of low-skilled Mexican workers were hired to support the economic development of the southern states in the U.S. But contrary to popular belief, such migration was mostly temporary –ranging from a few months to a couple of years—, a trend that prevailed until the end of the 1960's, when the Mexican economy began to decline and a marked growth in settlements took place (Rouse 1992). Towards the end of the last century, the massive-scale migration of Mexicans towards the U.S. was already considered as 'the largest sustained flow of migrant workers in the contemporary world' (Massey et al. 1998, 73).

For Fitzgerald (2006, 282) Mexico has had 'a clear, if ineffective policy to control what types of people left, where they came from, when they left, and the conditions of their exit and return'. The prevalence of major imbalances in work, income or life conditions with neighbours in the North American region, U.S. and Canada, and conflicting views between federal and municipal entities (ibid.), have been strong factors behind Mexico's fluctuating agenda on both emigration and immigration policies.

During the Mexican Revolution (in 1910) and more than a decade later, in the times of the economic depression in the U.S., a group of Mexican diplomats and government officials expressed the advantages of repatriating 'the good Mexican elements' who worked in different industries in the U.S. that did not exist in Mexico at the time –skilled mechanics and farmers— with the idea of employing their acquired skills abroad in productive activities and to contribute to the economic development of the country (Alanís Enciso 2003). The people that would be supported, however, would only include those who possessed some type of 'capital, work and intelligence' (Carreras de Velasco 1974). In the end, the government did not pay attention to these views, as no financial means were dedicated for repatriation, and no incentives –land, or work— were offered either (Alanís Enciso, ibid.).

A decade later, however, the Mexican government did carry out an extensive effort to recruit foreign *Brains* during the Spanish Civil War (1936-1939). The Republicans (a leftist coalition formed by socialists, communists and other left-wing political organisations that were democratically elected in February, 1936) faced a forced, massive-scale migration to several countries. Among the thousands of exiles, there was also an important group of scientists, intellectuals, artists, professionals and technicians. Mexico was one of the countries that most actively promoted the provision of refuge to the exiles, in order to use their knowledge and experience –high in comparison to the Mexican standards of the time– to boost its industrialisation and education system (Matesanz 1982). Even though it is very difficult to know the precise number, it is estimated that around 1,000 exiles were highly-skilled, particularly because the Spaniards were well aware of the Mexicans' interest in people with relevant degrees or experience, so 'in the blink of an eye, the building worker "suddenly" became an architect, or the mechanic an engineer' (ibid., 164). After the

Republicans lost the war, the exiles had no other choice but to stay in Mexico, and soon became 'both actors and spectators on two fronts: one for the liberty of Spain; the other, for the progress and welfare of Mexico' (Rejano 2000). After almost 80 years, this strongly pragmatic foreign policy from the Mexican government to provide refuge to Spaniards (many of them skilled) resulted in several improvements for the country, in fields like higher education, culture, biomedical sciences, agriculture, medicine, chemistry and art. Several scholars (Cosío Villegas 1976; Reyes Nevares 1982; Serrano Migallón 2006) consider the Spanish exiled as a rich heritage for the Mexican population, who took several ideas from the immigrants and employed them as models or starting points, when the country was well on its way to modernity (Miaja and Maya 1982).

In the 1970's, Mexico opened its borders again for the arrival of Central and South American exiled skilled workers, who suffered political persecution in their home countries (Yankelevich 2002). However, it was clear that Mexican attempts to control and direct emigration flows were greatly surpassed by the policies for talent attraction and economic growth of the U.S., and from 1974 the government 'abdicated', in favour of an 'unregulated exit' of workers (Fitzgerald 2006, 282), which favoured skilled migratory flows towards the U.S.. With the creation of the Mexican Science and Technology Council (Conacyt) in 1970, Mexico encouraged a strong scholarship programme for undergraduate and postgraduate degrees abroad, with the objective of strengthening the country's higher education and scientific infrastructure. However, the efforts made had two effects: on the one hand, it indeed enabled the professionalisation and growth of numerous scientific fields and research centres, but at the same time, it popularised a model of mobility biased to the U.S., in view of lack of working opportunities or the low wages offered to graduates (Didou-Aupetit 2006).

As the uncontrolled flows of skilled emigration became evident, the Mexican government outlined a new series of strategies in an attempt to overcome the brain drain, which had grown exponentially by the 1980s, with the liberalisation of the economy. In order to counter the massive outflows, the National System of Researchers (SNI) was created in 1984 as an attempt to promote research productivity and raise the salaries of scholars, in order to retain them in the country (Schoijet and

Worthington 1993; Grediaga 2012). As a part of a mix between immigration and emigration policies, the Programme for Science Support in Mexico (PACIME) was created in 1990, co-financed by the World Bank, with three main objectives: i. Repatriate Mexican scientists; ii. Attract foreign scientists into Mexican research centres; and iii. Facilitate opportunities for Mexican scientists to enrol in post-doctoral or sabbatical terms abroad, of course, under a return option (Didou-Aupetit 2006). According to Didou-Aupetit (2010), a total of 1,068 foreign scientists arrived in Mexico between 1991 and 1997, and another 1,317 Mexican scientists were repatriated. However, the World Bank ended its financial support, which accounted for 21.5% of the total cost of the project (World Bank 1992), and the outcomes achieved (number of foreign scientists that remained, impact on scientific fields supported, or trajectories of repatriated *Brains*) are unknown (Didou-Aupetit 2010).

Diaspora-engagement policies: a change of paradigm

As has been said, in line with the world trends on the development of diaspora-engagement policies, the Mexican Talent Network (MTN)[5] was created in 2005, a joint initiative between the Mexican government and the skilled Mexicans working in Silicon Valley. As of 2016, the network was spread across 34 regional networks (named "chapters") across the world. The chapters are supported by different government agencies (mainly the Institute for Mexicans Abroad [IME], the Conacyt, and the Ministry of Foreign Affairs [SRE]) but are autonomous: each chapter can decide internally what areas and strategies to follow in order to establish networks and outline contributions to Mexico from abroad. In 2010, the regional network of the MTN in the UK was opened by the initiative of members from TEC of Monterrey's (a technological private higher education institution in Mexico) alumni association (called EXATEC), who sought to create a wider network of skilled Mexicans in the UK than their university's graduates.

To date, however, very little research exists on the network. Among the few studies, López Chaltelt (2009) pointed out the lack of a proper organisational structure to

[5] The Mexican Talent Network was re-named in 2016 to 'Red Global Mx'. However, I decided to keep the original name of the network in this thesis, as all of the interviews conducted referred to the MTN.

operate the network, as well as the absence of statistics and other relevant data to orientate decision-making processes on skilled migration, but at the time the analysis was made, there was no information on the structure of the network's regional chapters, the work schemes, or the projects made. Didou-Aupetit (2010) on the other hand, observed that the main challenges for the MTN consisted of the need for allocating sufficient resources to develop a long-term relationship between the government and the vast Mexican skilled diaspora spread worldwide, of identifying projects of mutual agreement and benefit, and of the abilities of the skilled expatriates to navigate through political interests.

This is why this study aims to contribute to fill this gap, by providing empirical evidence on how the MTN works (particularly in the case of the UK chapter), how it is organised, and what are some of its main outcomes to date. As collaboration at a distance is one of the interests of this thesis, it is highly relevant to analyse if such collaborations exist, and what is the role of the MTN in tackling them.

Assessing the brain drain in Mexico

As observed earlier, Mexican migratory settlements in the U.S. started to grow in 1960s, but the flows rocketed during the 1970s, due to economic constraints in the country. Skilled migration grew particularly during the 1990s, following the signing of the North American Free Trade Agreement (NAFTA). As Delgado Wise et. al.'s (2015) figures show, in 1990 Mexico had around 5 million migrants worldwide (98% of them in the U.S.), ranking sixth in the world. By 2013, however, the migratory outflows showed that 13.2 million Mexicans had left the country, placing the Mexican diaspora second worldwide, after India (Delgado Wise et.al., ibid.). To these figures, we should also note that the Mexican-origin community in the U.S. is estimated at 23 million Mexican-Americans (Pew Research 2015).

With regard to skilled émigrés, and as commonly occurs with other cases of skilled migration in the world (Carrington and Detagriache 1998; Kupiszewski 2002; Beine, Docquier and Oden-Defoort 2011), Mexico has numerous problems to assess the magnitude of the brain drain. Fragmented, scarce, and often out-dated information has left no choice but to resort to estimations. Notwithstanding, these are just as

impressive: according to Delgado Wise et. al. (2015), as of 2013 there were a total of 835,570 skilled Mexicans abroad with undergraduate degrees completed (87.8% of them in the U.S.), and another 195,776 with postgraduate degrees (81.7% in the U.S.). Even though these estimations have numerous limitations, such as fragmented sources and often-conflicting methodologies (Delgado Wise et. al. 2015; Delgado Wise, Chávez and Rodríguez 2016; Gaspar and Chávez 2016), similar figures were estimated by Tejada and Bolay (2005), and by Tuirán and Ávila (2013); the latter outlined a worrisome scenario for Mexico, as on average, one out of ten Mexicans with undergraduate degrees, and one out of four with postgraduate studies live in the U.S.

Likewise, Mexico is also the most important sending country of students within Latin America (Luchilo 2008). According to the Conacyt (2000), since the creation of the scholarship programme for studies abroad, in 1971 and until 2000, only 5% of the grant-holders did not return to the country. However, this percentage has been looked at with scepticism because of its limited correspondence with the recruitment of researchers in the SNI, or with the improvement of Mexico's scientific power (Licea de Arenas 2003; Castaños-Lomnitz 2003; Herrera Márquez et. al. 2004). This estimation has not been updated since 2000, and perhaps more important for the purposes of this research, there is no information on the location of those "drained brains". As of 2016, 6,572 Mexican students were studying abroad sponsored (or partly sponsored) by different agencies of the Mexican government (mainly the Conacyt) and other national and international funds (Conacyt 2017a).

In the longstanding debate on the Mexican skilled migration, attention has always been placed on the migratory flows to the U.S. The size of such flows explains this priority, but other cases may offer valuable insights to understand the dynamics by which contemporary Mexican skilled migration takes place. In Europe, the MORE project (2010) studied the mobility patterns and career paths of researchers in EU27 countries. As of 2007, it estimated that there were 52,333 Mexican full-time researchers working in different sectors in these countries, more than double than the ones who were working in the European area in 2000 (24,799). Within these figures, one of the most relevant receiving countries is the UK, but how many Mexican skilled émigrés go there? I address this issue next.

Mexican skilled migration to the UK

Unlike with the U.S., Mexico and the UK are relatively distant countries. More than 5,500 miles, including the Atlantic Ocean, separate Mexico City from London, and even though the bilateral trade has doubled since 2010, both countries continue to have modest economic ties: Mexico is currently the 30th largest market for UK goods exports, whereas the UK represents only around 1% of Mexico's total trade[6].

Likewise, the Mexican migratory flows to the UK are rather modest in comparison to the U.S., and have been frequently left out of the assessment of the brain drain debate in Mexico. McIlwaine and Bunge (2016) carried out one of the most important attempts to provide a robust estimate of the size of the Latin American population in the UK. They mainly based it on the most recent data from the 2011 Census, and in order to provide information on the most recent arrivals to the country, they did additional calculations from other data sets, such as the National Insurance Number (NINo) registrations. These estimations show that around 11,143 Mexicans were living in the UK between 2011 and 2013, divided as follows:

FIGURE 1.

MEXICANS IN THE UK[7]

ESTIMATIONS 2011 - 2013

2011 Census	England and Wales	9,065 (3,785 in London)
	Scotland	620
2012-2013	NINo registrations	1,458
	TOTAL	11,143

Source: McIlwaine and Bunge 2016.

However, as the authors acknowledge, the number of Mexicans is larger, as these estimations do not consider second generation Mexicans, the NINo registrations in 2012-2013 do not count children, and no precise numbers are available for irregular émigrés. But perhaps more important, the Census only takes into consideration the population that has been in the country for at least one year, and therefore students (particularly those doing short-term visits and one-year Master's degree programmes),

[6] "Mark Garnier speech to the British Chamber of Commerce in Mexico". 14th of February 2017. Available online: https://www.gov.uk/government/speeches/mark-garnier-speech-to-the-british-chamber-of-commerce-in-mexico

[7] No disaggregated data is available for Northern Ireland.

are left out. Given their relevance as one of the most important (floating) Mexican immigration groups in the UK, the Higher Education and Statistics Agency's (HESA) data was consulted. As Figure 2 shows, there has been a considerable growth of 32.4% of Mexican student inflows to the UK in only five years, from 1,650 in 2010-2011, to 2,185 in 2015-2016. According to the Conacyt (2017b), as of 2016, 1,446 Mexican students in the UK were sponsored by different Mexican agencies and other international funds:

FIGURE 2.

NUMBER OF STUDENTS WITH MEXICAN NATIONALITY IN THE UK

2010-2011 & 2015-2016

	2010-2011			2015-2016		
Level of study	**Female**	**Male**	**Total**	**Female**	**Male**	**Total**
Doctorate	250	330	580	295	395	690
Masters	325	380	705	510	540	1050
Other postgraduate	20	30	50	45	50	95
First degree	95	110	205	155	115	270
Other undergraduate	55	45	100	50	40	90
Total	**745**	**895**	**1,650**	**1,055**	**1,145**	**2,185**

Source: HESA Student record 2010/11 - 2015/16

Likewise, HESA records showed that 345 staff with Mexican nationality was working in the UK as of 2015-2016, a figure that was unknown to date:

FIGURE 3.

NUMBER OF STAFF WITH MEXICAN NATIONALITY IN THE UK

2010-2011 AND 2015-2016

	2010-2011			2015-2016		
Academic employment function	**Female**	**Male**	**Total**	**Female**	**Male**	**Total**
Teaching only	25	35	60	35	45	80
Teaching and research	25	35	60	35	45	80
Research only	55	90	145	60	125	185
Total	105	160	260	130	215	345

Source: HESA Staff Record 2010/11 - 2015/16

Given these figures, what is the estimated size of the Mexican highly-skilled population in the UK? Based on the micro-data of the UK 2011 Census (a sample of 10% of total), McIlwaine and Bunge (ibid., 14) found that 76% of the Mexicans were highly-skilled, and around 90% were of working age (between 18 and 59 years old). Despite being the fourth largest group of Latin American émigrés in the UK –after Brazil, Colombia, and

Argentina— the Mexicans were found to be one of most highly-educated, and with greater levels of working age within the Latin American community. Even though more recent information from the Office for National Statistics (ONS) was found[8], this study will follow McIllwaine and Bunge's estimations: in 2013, around 8,470 highly-skilled Mexicans were living in the UK.

Altogether, these efforts to estimate the number of Mexican skilled émigrés reveal that, in many ways, skilled migration has relevant implications for the development and welfare of Mexico. Questions like *Who are these more than 1 million skilled Mexicans (around 8,470 of them in the UK)? Where are they? Where do they work?* or *What are the outcomes of their work?* appear as unavoidable. Following this qualitative perspective, Didou-Aupetit and Gérard (2009) emphasise that the outcomes from contemporary mobility dynamics of skilled émigrés have been scarcely investigated in Latin America, namely, the activities regarding knowledge-transfer, capacity building, or how international scientific and professional networks operate are topics of concern for brain drain studies in the region. This case study of the Mexican scientists and engineers in the UK, aims to contribute to fill these gaps.

Research questions

The main research question this study asks is: *What has been the experience of Mexican scientists and engineers in the UK, and what is the relevance of this experience for the contemporary policy debate on skilled migration and the brain drain in Mexico?* This question encompasses the three main aspects on which this study is focused –the *Brains* as individuals, the *Brains* as professionals, and the *Brains* as subjects for diaspora-engagement policies— and emerges from my interest to analyse in-depth the role of skilled émigrés in late modernity, where knowledge has become one of the main drivers for economic growth and development in the world. Precisely because of their knowledge and skills, numerous countries strategically target highly educated and skilled individuals as an essential part of their development strategies, with particular interest in those holding degrees in STEM fields, as these competences play

[8] According to the ONS (2016) around 14,000 Mexican-born émigrés were residing in the UK in 2015, but no in-depth information is available on their level of skills.

an important role in innovation, power and national prosperity (James 2011; Gonzalez and Kuenzi 2012).

From the three topics chosen (transnationalism, professional experience, and collaboration at a distance), some specific questions emerge:

Transnationalism, identity and belonging

- What patterns and differences can be found in the decisions of Mexican scientists and engineers to leave Mexico/to remain in the UK?
- What is their life like in the UK, and what challenges do they face?
- What elements of a transnational behaviour do the émigrés adopt, and how does this transnationality influence their identity?

Professional experience

- As 'drained-brains', what do the émigrés think of the brain drain?
- Where do they work in the UK, and what are their perceptions about their work?
- What are the most relevant differences they identify in their fields in comparison to Mexico?
- What is the role of networks, communities of interest and invisible colleges in their professional endeavours?

Collaboration at a distance

- Are the émigrés engaged (or have been engaged) in collaborative activities with Mexico from the UK?
- Do they think collaboration at a distance is feasible in their fields, and if so, under which circumstances?
- What is the relevance of the Mexican Talent Network in tackling long-distance collaborative initiatives?
- What ideas and recommendations can be drawn for science policy?

My approach is guided by a perspective that is well-summarised by Gaillard, Gaillard and Krishna (2015, 270): 'It is indeed rather unthinkable that anyone can pretend or assume that home countries do not suffer from the loss of their highly trained skilled personnel or professionals (…) At the same time, it is also difficult to imagine that they cannot potentially benefit from their highly qualified expatriates in terms of transfer of technology, remittances, political support, networks, etc. (…)'. By bringing out of the shadows a Mexican migratory group that has been practically unexplored to date, the accounts aim to provide a better understanding on *who are* these Mexicans, *what they do* in the UK, and *what can be done* to build more bridges with them at a distance.

Chapters overview

This thesis is structured in seven chapters: *Chapter two* outlines the theoretical framework in which the empirical findings are based. It addresses the evolution of the conceptualisations on the brain drain, as well as key topics from STS literature that are pertinent in this study, such as the debate between 'vocation' and the 'moral equivalence' of scientists and engineers; the relevance of the communities of interest and invisible colleges in knowledge production, as well as their role in influencing mobility decisions. Migration theories, on the other hand, are addressed from a chronological perspective, with particular emphasis on transnationalism, identity and its challenging relationship with the state. On the other hand, the professional perspective of skilled migration includes the association of knowledge with power, as well as the asymmetries that knowledge production entails, in order to explain the role of skilled individuals in knowledge-based economies. Finally, the chapter examines the policy perspective, where different efforts have been made to attract, retain or contact skilled émigrés, in both sending and receiving countries, with special interest in the issue of collaboration at a distance, diaspora-engagement policies and scientific diplomacy.

Chapter three explains the methodology and methods that were employed to guide this study. In general, the majority of the studies on the brain drain are quantitative, thus the need for a qualitative study is justified in order to focus on skilled migration as a societal process. It also explains its constructivist approach of the thesis, as well as

the pertinence of a case study. The chapter also introduces the characteristics of my interviewees (the *Brains* and the *Officials*), and the basis on which they were selected. Finally, it describes the coding processes made, the scope and limits of the thesis.

Chapter four constitutes the start of my empirical findings. The migration experience of the *Brains* is presented chronologically. As will be shown, career-related motivations since the early stages of their lives constitute the main factor both in the decisions of skilled individuals to leave Mexico, as well as to remain in the UK. The emergence of a transnational identity is observed as a progressive development within the migration experience, shaped by the acculturation process in the émigrés' receiving country, as well as from the presence of relevant "anchoring" factors to remain abroad, namely, personal relationships (primarily when *Brains* meet and fall in love with other *Brains*) and further work opportunities. However, the transnational perspective also reveals migration as uncertain in a good number of cases, with constant deliberation and reflexivity processes between past and actual life, where important sacrifices involve mainly the relatives and friends left behind. These notions are important for identifying the numerous connections and ties (mainly personal) the *Brains* maintain with Mexico from a distance, where identity frames these skilled individuals as *neither from here nor from there*.

Chapter five focuses on the professional experience of the *Brains* in the UK. In the first part, traditional connotations of the brain drain are contrasted with the views of my interviewees as "drained brains". Here, their experience is fundamental to contrast some of the traditional assumptions of the brain drain, as their perceptions oscillate between conceiving skilled migration as a "normal" phenomenon made by human activity, and as a negative phenomenon because of its implications for Mexico. The second part addresses the views of the émigrés as scientists and engineers working in the UK, where relevant imbalances between the skilled labour market of Mexico and the UK emerge as harsh realities to consider regarding the development of their fields. Six imbalances are addressed, including budgets, funding and investment; infrastructure and equipment; R&D activities; the relevance of networks and communities of interest; a triple helix collaboration; and underlying working conditions. Yet, the *Brains* deny intellectual differences with their counterparts in

Mexico. This chapter allows a deeper understanding of the professional pathways and a rationale of why skilled émigrés choose to remain in the UK.

Chapter six addresses the issue of collaboration at a distance. The first part explores the long-distance collaborative initiatives with Mexico that the *Brains* have been able to establish from the UK, how they vary according to their work sector, how they are formed, and some of their implications for Mexico. The second part is concerned with the role of the Mexican government for tackling distant collaborative initiatives, mainly through the Mexican Talent Network (MTN), the government's main diaspora-engagement policy. By combining the views from *Brains* and *Officials*, previous findings on diaspora policies, and the notion of scientific diplomacy, some of the main challenges and shortcomings of the MTN are addressed. A series of policy recommendations are then suggested with the intention of building more bridges with the Mexican skilled diaspora, and at the same time, to better understand – and face— the challenges of contemporary skilled migration in future years.

Finally, *chapter seven* presents the conclusions to the thesis. It is argued that a more balanced exchange between Mexico and the UK can be achieved, as findings show that the professional experience of Mexican scientists and engineers in the UK grants them a "membership" to relevant communities of interest, where imbalances between the Mexican and the British labour market are important reasons to remain. However, a considerable number of the *Brains* (more than half) also make use of these imbalances to engage in collaborations with Mexico from the UK. Without overlooking the negative implications of skilled migration on a massive scale, these findings show how the migration of Mexican scientists and engineers can also provide benefits for both sending and receiving countries. The thesis argues that it is important for policy-makers to understand the relevance of skilled individuals' choices and preferences, the value of communities of interest, or the challenges posed by the imbalances between central and peripheral countries, where a wider harmonisation between government, industry and academia is needed to provide more incentives for diaspora-engagement. This chapter also discusses how these findings contribute to the literature of migration studies and STS, its limits, and ends by presenting possible areas for future research.

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Before we continue, it is important to clarify that, as a qualitative piece of research, this thesis does not aim for generalisation or representativeness. It is based on a case study of Mexican scientists and engineers in the UK, and an emphasis is placed on the particularities of this migratory group. From this viewpoint, however, many of the literature and policy reports that guided this research are international, and I believe that this case study can shed light over other similar cases of skilled Mexicans and Latin Americans in the UK and the world, both for understanding the relevance of skilled individuals, and for the policies for tackling their contributions at a distance.

Additionally, this study faces several definitional challenges surrounding skilled migration and the brain drain. On the one hand, there are currently no standardised definitions on what is the brain drain, or how to assess it, and furthermore, there is no current agreement on *who should be counted as a Brain.* It is therefore necessary to take a stance to guide conceptually and empirically the contributions of this study. In the thesis, I refer to as 'highly-skilled' and 'skilled' (or *Brains*) to those individuals holding at least an undergraduate degree earned in Mexico, but I am aware that many other studies may disagree or have a different focus[9].

On the other hand, my sample is comprised of Mexicans graduated in STEM fields in Mexico, but as we can observe in figure 4, their occupations (in academia or the private sector) involve research and non-research activities, which point to frequently entangled notions of 'scientific migration' and the (much broader) phenomenon of 'skilled migration'. Even though there is a much deeper focus in researchers in this study, and an appreciation of how science is done, what prevails is what the migrant experience implies for the broader debate of skilled migration and its policy implications. In his discussion of the scientific vocation and its relevance for the more recent rise of entrepreneurial science, Shapin (2008) argues that within the corporate world, the challenges to operate a business, make products, recruit and motivate people, organise the corporate environment, locate markets or identify competitors

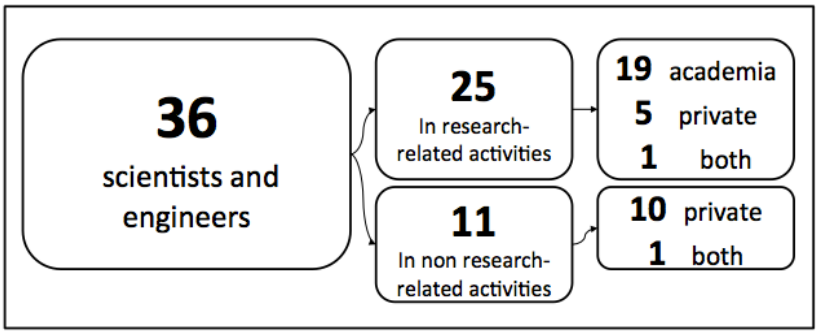
[9] Chapter 2 addresses the numerous conceptualisations about the highly-skilled in the existing literature.

are indeed intellectual challenges, and growing matters for concern within the scientific world. In a similar vein, elements of paramount relevance in modern science, like the pursuit of international education and experience, the organisation of informal networks, the presence of clusters and infrastructures as relevant means for the production of knowledge and its authority, and ultimately the pursuit of prestige and recognition, are also present in the corporate world.

In many ways, the decisions to perform research or non-research activities are part of the life chronologies I wished to portray, and are particularly important for this study because diaspora-engagement policies (including the MTN) commonly target both researchers and non-researchers to establish long-distance collaborative initiatives, which calls for a much wider conceptualisation than solely scientific migration. An effort is made in this study to show contrasts and similarities between these "two worlds", through the lens of the experience and pathways of the Mexican scientists and engineers in the UK:

FIGURE 4. THE *BRAINS*

QUALITATIVE INTERVIEWS SAMPLE



In the preface of this chapter, my favourite anecdote (from *Quiquillo*) is quoted. To me, it depicts very clearly what this thesis is about: the migration experience as a constant deliberation between past and actual life, where a transformation of the notions of identity and belonging take place along with the preservation of family connections, the challenges of establishing collaborative initiatives at a distance, and ultimately, a tough decision that is taken with no regret. As with *Quiquillo*, my interviewees were willing to contribute to this study because they thought their story was important enough to be shared. This research hopes to contribute in the visibility and recognition these other Mexicans in the UK deserve.

Chapter 2

Perspectives on skilled migration and the brain drain:

A review from STS and migration studies

Introduction

This chapter proposes a theoretical framework on which this empirical research is based. As explained in the introductory chapter, this study establishes connections between STS and migration studies to address skilled migration and the brain drain in the case of STEM-graduated Mexican scientists and engineers in the UK, under three main aspects: the *Brains* as individuals, the *Brains* as professionals, and the *Brains* as subjects of diaspora-engagement policies.

As a societal process, skilled migration and the brain drain are notions in constant evolution. For this reason, this chapter revisits first the conceptualisations about skilled migration and the brain drain to illustrate the numerous definitional challenges in the contemporary debate, which involve tensions between the temporalities abroad (mobility or migration?), the numerous difficulties for assessing the brain drain as a problem and its consequences for sending countries, and even for defining *who should be counted as a Brain*.

As I explained in the previous chapter, this study resorts to the notion of transnationalism as one of the latest theoretical frameworks to explore the migrant experience. A historical background is provided on migration theories regarding the motivations of skilled émigrés to leave their countries of origin, from a chronological perspective. Different scales and approaches are analysed, from essentially macro-level and economic theories of "push" and "pull" factors and rational choices, to meso-level theories of dual-market labour and world systems theories, and more recently, micro-level approaches that are focused on the perspective of the individual, which conform the grounds for discussing transnationalism. Given that my interest is placed

on knowing what elements of a transnational behaviour my interviewees adopt, this chapter addresses the context where transnationalism re-emerged, the reflexivity that transnationalism entails for the notions of identity and belonging, and the complex challenges it poses for nation-states (and state-bound policies) in late modernity.

The discussion is then placed on the role of the *Brains* as professionals, where relevant notions to guide my empirical findings involve relevant scholarly debates from STS, such as the historical association of knowledge with power, where asymmetries in power relations between developed and developing countries are closely related to asymmetries in knowledge production, from which significant labour markets differentials between these countries give rise to a distinction between central and peripheral countries. These asymmetries will provide a context to discuss a contemporary portrait of skilled migration in chapter 5.

Within the professional trajectories of skilled émigrés in their receiving contexts, another significant theoretical debate within STS is related to the notion of professional/scientific identity, where a reflection is made between the 'vocation' and the 'moral equivalence' of scientists and engineers, as a way to widen our understanding of why the *Brains* choose to leave their countries of origin in pursuit of better scientific/professional horizons. From this viewpoint, the notions of 'communities of interest' and 'invisible colleges' also constitute two relevant contributions from STS to guide this study, as they can enrich the explanation of how scientific/professional networks are formed, how they operate, and what are their implications for facilitating mobility.

Finally, this chapter examines the policy perspective, where the numerous conceptualisations about the brain drain and its actors have paved the way to numerous initiatives from governments, scholars, and international organisations to attract, retain, or contact skilled émigrés in both sending and receiving countries. Particular attention is dedicated to diaspora-engagement policies, as one of the most recent efforts made to establish long-distance collaborative initiatives. Within this discussion, a recent notion of STS is scientific diplomacy, or the potential role of scientific communities in facilitating broader arrangements via systematic

collaborations. These two elements (diaspora-engagement policies and scientific diplomacy) will be contrasted later on, with the case study of the Mexican Talent Network, in chapter 6.

2.1 A series of definitional challenges: conceptualising skilled migration and the *Brains* in late modernity

2.1.1 Defining skilled migration and the brain drain

For Ackers and Gill (2008, 3), the brain drain takes place when there are significant outflows of talent, 'unmatched by compensatory inflows' that 'may indicate a net loss of knowledge or scientific expertise to the sending country and a potential gain to the recipient(s)' on what it would seem is a 'zero-sum game'. Due to this 'net unidirectional flows of highly-skilled migration' (Salt 1997), for Gaillard and Gaillard (1997), the brain drain gained recognition as it was perceived as a 'politically correct' battle to be fought by developing and developed countries, based on the values of solidarity that no one would oppose. To them, 'the brain drain is, and always was, a concept often used in the newspapers and in articles for the lay reader' (ibid., 196). Ever since, the media coverage has had considerable effects on the public concern regarding the departure of highly-skilled individuals.

Throughout its history, the brain drain has been framed in many different ways: as 'a contentious issue in the North-South debate' (Carrington and Detragiache 1998); as a response to 'a general situation of asymmetry in the relationship among nations' (Portes 1976); as an ethical and moral dilemma, given the likelihood that the flight of human capital may be an 'indirect subsidy' from the developing to developed countries (Ahmad 2004); and even as a worldwide concern that may be 'ultimately attributed to the revival of nationalism' (Grubel 1966).

Within these contested understandings, there is a close relationship between skilled migration and the brain drain (both terms are used interchangeably throughout this study) but a distinction made by Tigau (2013) is pertinent for clarification: while skilled migration refers to the mobility of highly-skilled individuals, the brain drain emphasises the notion of loss generated by such migration.

Besides the challenges to define the brain drain, another key controversy has consisted on the temporality of the *Brains'* stay abroad. From the 1960's when the brain drain concept first emerged, discussions on temporality have progressively changed: from a focus on fixed migratory moves (Grubel 1966; Portes 1976; Todaro 1985) and a notion of "permanent loss", to more flexible dynamics based on mobility and circulation (Gaillard and Gaillard 1997; Iredale 2001; Saxenian 2005; Didou-Aupetit 2010), facilitated by the forces of globalisation, open markets, the growingly international character of postgraduate education, the structural conditions of modern science and the corporate world, and declining transportation costs. As Didou-Aupetit and Renaud (2015) show:

> If the economy of tourism is flourishing, the economy of study tours, professional and scientific encounters are even more so. Students are increasingly going abroad. At the end of a more or less long stay, some stay in the countries that received them. Others return to their place of origin, with a rich intercultural experience and diplomas appreciated, even overvalued. An increasing but still small number of graduates enter complex mobility spirals and undertake training or professional stays of more or less duration in third countries, different from their places of birth and training (ibid., 12).

As a result of this growingly complex mobility patterns, in the late 1980s and early 1990s the brain drain concept was revisited with 'more optimistic' approaches (Gaillard, Gaillard and Krishna 2015). Scholars began to use terms like "brain exchange" or "brain circulation" to frame these recent dynamics of skilled migration (Meyer 2001; Wallace 2002; Davenport 2004; Saxenian 2006; Didou-Aupetit 2010), and the emphasis on fluidity and circulation was a novel approach to understand skilled migration and 'allay the fears associated with brain drain' (Ackers and Gill 2008, 13). Increasingly dynamic flows were strengthened by the temporary return of skilled people to their home countries and by the emergence of networks, 'reconnecting expatriate scientists to their national community' (Gaillard, Gaillard and Krishna 2015, 270), which generated new possibilities and a more complex logic of the phenomenon, closer to the notion of transnationalism. But even under permanent or flexible migratory flows, the challenge on whether skilled migration was problematic or not remained. I address this issue next.

2.1.2 Assessing the brain drain

As observed in the previous section, different (and often contested) conceptualisations regarding the brain drain and the temporality of migration are commonplace. In the same vein, assessing the volume of skilled migration (and hence, to determine whether or not a country has a "brain drain") is highly problematic, as there are no standardised procedures to address the figures and characteristics of skilled migrants (Carrington and Detagriache 1998). For instance, Kupiszewski (2002) registered massive variations between the figures in sending and receiving countries, and concluded that conducting estimations for international migration is 'the most difficult task that demographers face' (ibid. 643). Indeed, up to date, most of the governments and international institutions have limited instruments to know, with an acceptable level of detail, about the qualifications of their emigrants (and their immigrants), as well as their intentions to remain abroad (or in the country).

However, it is possible to observe a few trends. During the 1990s, the U.S., the UK, Canada, France and Germany attracted up to 93% of the migratory flows within the OECD countries (Carrington and Detragiache 1998), and even within this group, data points to 'a one-way picture and one disproportionately towards the U.S.' (Hunter, Oswald and Charlton 2009). In section 2.5.2 we will observe how these countries are also the main ones to concentrate international students, and skilled workforce. One of the latest attempts to estimate a rate to determine the threats of skilled migration was made by Beine, Docquier and Oden-Defoort (2011), who calculated that the net effect of the brain drain is positive when skilled migration 'is not too high' (lower than 20–30% of total, depending on the country characteristics). According to them, 'when the emigration rate exceeds that threshold, the human capital loss induced by the brain drain increases exponentially'. In a similar effort to quantify the brain drain, Adams (2003) estimated that the brain drain occurs when the migration rate of the highly-skilled population is over 10% in the sending country.

From these trends, it is possible to observe that there are actually considerable gaps in quantifying the number of skilled émigrés in receiving countries, their patterns of mobility, or the migration rates per country/field of knowledge. In addition, specialists,

scholars and policy-makers have not reached an agreement to date on how to assess the brain drain (or in other words, to establish *when* skilled migration becomes problematic), and quantitative methods often lack complementary qualitative studies to gather more information. Moreover, definitional challenges involve essential questions regarding *who should be counted as a Brain* in late modernity. This issue is addressed in the next section.

2.1.3 Who should be counted as a *Brain*?

As with the brain drain concept, the notions of who is considered highly-skilled (or a *Brain*) have varied greatly throughout time. According to Chiswick (2011), during the time of the Colonised American Continent, the highly-skilled were work craftsmen, blacksmiths and producers of wheels and cannons, and by the middle of the 19th Century, the group of highly-skilled were craftsmen, mechanics, and office workers who knew how to write and keep book records. Timms and Hughes (2003) used the term "intellectuals" to refer to the vast numbers of skilled German exiles during the Second World War, while Matesanz (1982) referred to the Spanish exiles in the Civil War mainly as "professionals". However, as these authors note, it was evident that there were many "non-intellectual" and "non-professional" individuals among German and Spanish exiles.

For this reason, contemporary migration studies aim for more comprehensive terms in order to increase the scope of analysis. Rodríguez (2009) employed the term "highly-skilled" to describe all those who have tertiary education studies (even if they are incomplete), which is one of the most used definitions by international organisations nowadays, while Davenport considers academic qualifications 'or an experience equivalency', on what she describes as 'scientific and technical human capital' (2004, 617). However, the increasing presence of specialised groups working in large technology hubs like Silicon Valley (a good number of them with no academic degrees) motivated new approaches to the notion of highly-skilled. In this regard, Solimano (2008) referred to the concept of talent, 'as the innate ability of individuals to develop ideas and objects, where some have an economic value' in an attempt to address this

greater number of professionals, intellectuals, scientists, and experienced technicians from a wider range of fields.

As this section has shown, the issue of who should be counted as a *Brain* is not simple, particularly as 'there are currently no agreed definitions of highly-skilled workers at an international level' (Day and Stilgoe 2009, 11). However, it can be agreed that the possession of specialised knowledge and/or an advanced level of skills has always been embedded in the conceptualisation of skilled workers/individuals. For this reason, it is necessary to take a stance on who should be counted as a *Brain*, at least for the purposes of this thesis.

As many studies have noted (Florida 2005; Solimano 2008; Tigau 2013), in recent years scholarly debates have focused on the assessment of talent on the basis of occupation, rather than in earning a professional degree (Florida 2005; Tigau 2013), but even though this notion of talent would be more comprehensive –as it covers a great number of professionals, intellectuals, scientists, and even computer geeks with no university degrees and other experienced technicians in many fields of knowledge— I found it very problematic to delimit the scope of analysis, as the notion of "highly-skilled" would have become too subjective and difficult to portray (i.e.: *How to distinguish between talented and untalented individuals?*) and would compromise the objectives of this study. Besides, other professionals, valuable as they may be, would be out of the scope of the theoretical approaches of STS. This is why for the purposes of this research, I refer as highly-skilled (or *Brains*) to those individuals who hold at least a BSc degree, and that was obtained in Mexico.

2.2 Towards the re-emergence of transnationalism: A historic review of migration and development theories

One of the research questions guiding this study, is concerned with finding key patterns and differences within the decisions of Mexican scientists and engineers to leave Mexico. In the literature, these reasons have been studied from many different angles, at different macro, meso and micro-levels. I will analyse them chronologically, where it will be possible to observe how migration studies have changed their focus – from predominantly quantitative to a mix between quantitative and qualitative

approaches. In this section, key contributions and shortcomings are stressed in order to relate them to my study, as a preamble for discussing transnationalism.

2.2.1 *The macro-level:* Neo-classical economic theories

During the 1950s and 1960s, neo-classical economics started to explain highly-skilled migratory movements from developing to developed countries. A common argument placed emphasis on skilled migration as the result of a mixture of "push" and “pull” factors (Todaro 1969; Jenkins 1977; Chukunta 1979): The “push” factors referred to causes which impel highly-skilled individuals to leave their countries, while the “pull” factors described the general conditions that attract them to the receiving countries. These studies framed “push” and “pull” factors as the result of a cost-benefit analysis, where low wages in developing countries were commonly pointed as the main reason for skilled workers to leave (Arango 2000; Harzig, Hoerder and Gabaccia 2009). Many scholars emphasised the local context of sending countries as one of the root causes for the brain drain. For Jenkins (1977, 186) societies ‘in transitional modernisation, experiencing rapid population growth unmatched by expansion of rural or urban economic opportunities’ were more prone to “push” their workforce away —both highly and low-skilled. Along with differences in employment opportunities, breaches in quality of life (safety, health, education and other services) also constituted an essential part of these studies. At the same time, local conditions within developed countries represented key drivers that shaped skilled migration. Besides quality of life, some of the common elements identified as drivers were longstanding scientific traditions, internationalised higher education institutions, world-renowned research centres, and relevant budgets to fund research and development, as well as attractive work opportunities.

However, this theory was criticised for being too reductionist in explaining the desires for migration, as the relationship between “push” and “pull” factors is blurry –not independent, but related to each other– and varies according to the specificities of each profession (Iredale and Appleyard 2001). Moreover, this approach could not explain why most skilled individuals in sending countries stayed and some others leave (Portes 1976), and also neglected the important differentials in regard to living

standards and living expenses between sending and receiving countries. A better life and a higher salary was assumed as a fact, as stated by Harzig, Hoerder and Gabaccia (2009, 63): 'Even the neo-classical economists, "male breadwinners" would have suggested the question: "What was the cost of bread?"' As we will observe in chapter 4 (sections 4.6 to 4.9), living expenses and living standards are highly-relevant in the Mexican émigrés' perceptions of their past and actual life: as socioeconomic elites, many of their living expenses and living standards were actually better in Mexico, particularly after considering its highly unequal income distribution.

Following such criticism, subsequent neo-classical economic approaches focused on the decision-making processes of individuals from a rational choice perspective –and not only on "push" and "pull" factors at the *macro* level, under which émigrés conceived migration as an investment in their human capital, where their criteria to leave were based on income-maximisation (Sjaastad 1962; Arango 2000; Harzig, Hoerder and Gabaccia 2009). However, this approach was again considered too narrow to explain skilled migration, as individuals pursue professional opportunities under many other rationalities besides income, such as the acquisition of international experience, or career development, where mobility plays an important role (Ackers and Gill 2008). Likewise, reputation is another relevant motivation for skilled émigrés. The 'magnetic' and often 'multiplying effect' of top quality research centres, universities, private corporations, and global cities constitute major attractors, particularly for young talent (Mahroum 2001; Vizi 1993; Sassen 2001). Other professional reasons involve work environments –where productivity and a professional reward structure are widely valued among skilled individuals– (Børing et. al 2015) as well as the advantages in the use of English, as the international language *par excellence* that grants access to global careers, networks, publications and international projection (Ackers and Gill 2008; La Madeleine 2007; Oppenheimer 2010). In addition, other reasons to migrate –which involves diversified risks, family considerations, personal life-course expectations, and other future and present considerations— reveal that decisions to migrate are subject not to one, but to many rationalities in different aspects of the émigrés' lives (Harzig, Hoerder and Gabaccia 2009).

Even though we have noted the limitations from macro-level perspectives of neo-classical economics, their contributions to the study of migration are relevant, and in many ways up to date, given that "push" and "pull" factors constitute important elements that influence the decisions of skilled émigrés to leave their countries. As will be argued in chapters 4 and 5, the presence of "push" and "pull" factors are highly relevant to discuss the different rationalities behind the *Brains'* decisions to leave Mexico/remain in the UK. However, we will also be able to observe how these "push" and "pull" factors are actually interrelated and blurry, and consequently I suggest the term "anchoring" factors (chapter 4, section 4.5) in order to emphasise how decision-making processes are not only shaped *before* migration takes place, but more important, *during* the migration experience.

2.2.2 *The meso-level:* Dual labour market theory

From the 1970s, new approaches emerged to explain migration at the *meso*-level. The "dual labour market theory" of Michael Piore (1979) concentrated on the conditions of employment in advanced economies, characterised by its stability, attractiveness, a focus on the primary sector, and a growing expansion in economic activity. According to these approaches, international migration is caused by a permanent demand for foreign labour in advanced societies, in order to fill positions that native-workers refuse (Arango 2000) or do not have the skills needed (in the case of skilled émigrés), which creates a dual labour market –one for the skilled, generally the native-born workers, and another one for the unskilled, generally the immigrants— characterised by stratification, segregation and segmentation (Harzig, Hoerder and Gabaccia 2009). Access to one or another is dependent on elements like the migrants' race, academic background, class, and nationality. Notwithstanding, the shortcomings of the dual labour market theory consist in its largely demand-driven focus on developed economies, thus neglecting other important "push" factors in the sending countries, and again, because it leaves out of its scope the individual initiative of the émigrés, who would arrive in larger numbers to more advanced economies on their own initiative, and not solely based on available work opportunities (Arango 2000). Moreover, in recent studies related to labour markets, the impact of skilled migrants in the development of entire work fields is receiving closer consideration: In her study of

the case of start-up founders in Switzerland, Sontag (2016) suggests that in ICTs, even the traditional assumption that 'mobility follows work' can be turned around: 'Work-related mobility' turns into 'mobility-related work', as the mobility of skilled individuals seems to create and influence the 'textures' of these careers (idem, 155).

However, the dual labour market theory posits important notions to consider for migration studies: According to Arango (2000), it emphasised the structural demand for foreign labour inherent in the economic structure in advanced countries, and in the case of the highly-skilled, a key notion relies on the relevance that skilled migrants give to their careers, and consequently to their career pathways (Salt 1983). Even under recent developments, the labour market theory still stands: while skilled migrants can choose to migrate to pursue career progress –either by studying abroad or by looking for work opportunities—, for poor families or unskilled migrants, migration constitutes a means for finding work that pays a living wage (Schmalzbauer 2005). These two factors, the structural demand for skilled labour in the UK on the one hand, and the skilled émigrés pursuit of international post-graduate studies and work opportunities on the other, constitute essential analytical guidelines of this study, and are developed in Chapters 4 and 5.

2.2.3 The World Systems Theory

Following the notion of asymmetries between developed and developing countries, and influenced by dependency theory[10], the "world systems theory" emerged to address the relationship between migration and development. According to it, developing countries (located in the periphery or the semi-periphery) produce mainly primary goods to be exported to more powerful economies (in the *centre*), where such goods are transformed into more advanced products and thus concentrate most of the benefits and wealth (Portes and Walton 1981; Hettne 1983). The world systems theory put emphasis on inequalities in terms of trade, markets reach and power relationships as major elements that induced skilled individuals to migrate, in view of more

[10] Dependency theory originated in the late 1940's from the work of political economists Raúl Prebisch (1950) and Hans Singer (1949), whose research reached similar conclusions in portraying developing countries in the global South as economically dependent on developed countries in the global North, which beget unequal terms of trade, benefits and wealth between the North and the South.

advanced scientific infrastructures (Shrum and Shenhav 1995) and better professional opportunities in the global North.

In Latin America, the study of the different effects provoked by these practices in developed and developing countries played an important role in the growth of STS in the region, with a focus on the North-South debate and dependency theory (López Cerezo and Verdadero 2003; Arocena and Sutz 2003). In their book *The Peripheral Science* (‘*La Ciencia Periférica’*) Díaz, Texera and Vessuri (1983) stated that even though the Latin American countries were participating internationally in science, it was evident that they performed in a secondary way, which manifested in the maturity of the conceptual elements employed, in their practices at the institutional level, and in their capabilities when defining the topics of research. For Rodríguez Medina (2013, 4), this ‘unevenness between regions gives rise to different practices, procedures, evaluation standards, and epistemic cultures. In short, centres and peripheries produce science differently’. This unevenness is one of the sources of highly-skilled migration: in more recent studies, Vessuri (2008) observed that Western science reproduces a model in which scientific exchange and the capitalist global economy cannot work without highly-skilled migration, because technological advance and scientific demands in modern economies go faster than the capacity of developed states to train specialised individuals. Recruitment of talent in the periphery is, then, a constant need for the centre.

In this research, the world systems theory will be returned to in chapter 5 (sections 5.1.2 and 5.1.3), when the conditions of labour markets for the highly-skilled in Mexico and the UK are addressed. Likewise, it will be revisited when the perceptions of my interviewees stress the imbalances between the development of scientific/professional fields in both countries, in key terms for the highly-skilled: budget, funding and investments; infrastructure and equipment; design, research and development activities; networks, triple helix collaborative schemes; and work conditions (chapter 5, sections 5.3.1 to 5.3.6). One of these imbalances –networks— is of particular relevance for scientists and engineers. I discuss next how migration studies meet STS in how networks operate in contemporary skilled migration.

2.2.4 The relevance of networks: Migration network theory, communities of interest and invisible colleges

One of the central elements to understand the behaviour and motivations of the Mexican skilled émigrés relies on the relevance of networks, in two, interrelated ways: firstly, the networks they establish throughout their careers ("opening pathways") and secondly, how such professional and scientific networks can be used to establish contact with them through long-distance collaborative initiatives ("building bridges"). In migration studies, networks emerged as a framework at the beginning of the 20th Century[11]. According to these studies, migratory flows appear as a self-generating, circular phenomenon, where interpersonal relations link migrants (and returning migrants) with relatives, friends, fellow countrymen/women and other skilled individuals, who accumulate and share information about their origin and destination areas, facilitate employment possibilities, provide financial assistance, and support each other in various forms, thus reducing the costs and uncertainty of migrating (Massey et. al. 1998; Arango 2000). More recent approaches began to address the migration network theory from the perspective of *agency*, which refers to the individuals' ability to decide and act based on their "human capital" on the one hand (which includes social links, professional expertise, languages and strategic competences) and their "social capital" on the other (which denotes people's ability to mobilise resources, make use and move within institutional backgrounds, negotiate demands and options, make associations, and express cultural identifications without alienating the network), both of which are important notions for explaining contemporary skilled migratory flows (Massey et. al. 1987; Harzig, Hoerder and Gabaccia 2009), and for reflecting on how migration networks can produce and reproduce inequalities (de Haas 2010).

Within the brain drain debate, the study of networks contributed by emphasising that skilled migration is not important solely from an individual perspective, but also for its collective attributes. In this vein, networks represent an important framework for

[11] According to Arango (2000), the work of Thomas and Znaniecki (1918-1920) referred to continuous migration cycles from Polish migrants in Europe and America, whereas Harzig, Hoerder and Gabaccia (2009) relate how the Dillingham Commission report (1911) already described sequential immigration flows from Eastern and South Europeans to the US.

understanding the interactions of skilled migration and transnationalism, as the links established by highly-skilled individuals were found to be powerful channels for emigration, but also for maintaining professional ties for collaboration with fellows at their home countries or institutions. As a result, networks can also play an important role for an eventual return to the home country (Daugeliene 2007; Ackers and Gill 2008).

However, as de Haas (2010) shows, migration network theories generally fail to explain that there is a selectivity condition within the process of migrating, comprised of 'migration-facilitating and migration-undermining mechanisms' that contests the assumption of circular migration processes going on *ad infinitum* (ibid., 1612). In the same vein, migration network studies often lose sight of the relevance of internal dynamics established by highly-skilled individuals within the networks, and their role as 'migration-facilitating' mechanisms. This is why two notions from STS are integrated in this part to illustrate the relevance, complexity and implications of scientific and professional networks: Latour's communities of interest and Crane's (and later on, Wagner's) concept of invisible colleges.

In his influential *Science in Action*, Latour decided to follow scientists and engineers to observe the 'inner workings of science and technology' (1987, 15). By approaching 'the back door of science in the making', rather than the 'grandiose entrance of ready made science', he was able to identify and describe the diverse processes behind the creation of scientific facts and technical artefacts, which implies an essential differentiation: Whilst 'ready made science' is a certain and unproblematic set of 'black boxes', 'science in the making' implies uncertainty, people at work, decisions to be made, competition, and a set of controversies to be resolved (ibid., 4). Even though it is largely based on the processes behind Western science and the creation of facts and artefacts, Latour's work offers an interesting alterative reading about the implications of scientific networks for skilled migration (and to reflect on the inequalities between the North and the South). To illustrate the processes taking place before the 'black box' closes, Latour formulated the story of Joao Dellacruz, a Brazilian electronic engineer who was working with his boss in the design of a chip, but progressively lost the interest of his sponsors —namely, the government, industry and

the military. The lack of resources would eventually condemn Dellacruz's research to isolation:

> 'This is indeed a sad story but certainly more frequent than the success stories (…) Joao cannot create a speciality, no matter how far outside he goes. His workshop is not at the centre of anything, it becomes the annex of a teaching institution. His thesis is not the text that every other researcher has to quote and to take into account; it is not even written. His chips are not the only design that can hold together the assembled interests of industry, government, the military, consumers and journalists; it has become an obsolete piece of technology (…) Instead of being able to establish itself a lab which has become the obligatory passage point for countless other people, Joao's workshop is a place no one needs to pass through. It is not strategically placed between anyone's goal and the fulfilment of this goal, and this means (…) that Joao interests no one' (Latour 1987, 151-152).

Without an explicit mention of the brain drain, Latour ends his story by narrating how the accumulation of flaws left Joao's boss with no choice but to leave Brazil for a position in Belgium, so he could continue with his research. This way, the perspective of science *in the making* shows the role of scientific networks to *make* research relevant: in the creation of scientific facts and artefacts, scientists and engineers are only part of a diverse range of stakeholders: politicians, academic associations, students, legal representatives, industries, journalists, and civil society, among others. The scientific endeavour thus demands the constant interaction between *outsiders* and *insiders,* under what Latour called 'communities of interest' (ibid.) to portray scientific (and non-scientific) networks working and interacting together. From a historical perspective, Jöns (2015) explains how increased academic mobility contributed to the rise of American, British, German, and more recently, Chinese universities to global knowledge hubs, or communities of interest.

The Latourian notion of communities of interest is closely related to the concept of 'invisible colleges' by Diana Crane (1972), who established that the 'growth of scientific knowledge is the result of the exploitation of intellectual innovations by a particular type of social community' (ibid., 2). Through invisible colleges, scientists engage in informal networks to work on a given paradigm, from a multi-disciplinary approach. To her, analysing how new knowledge is created through invisible colleges can provide a better understanding of how change and development in scientific ideas take place. In many ways, these advancements are possible because of three factors: an agreement about the importance of scientific problems; a growing number of specialists to attack the problem; and the environment, or institutional context, influencing the way

scientists behave. Even though Crane emphasises that the members of a research area can be geographically separated, these three factors occurring within the interactions of invisible colleges provide a broader reflection of why skilled individuals may want to migrate, in order to become part of more relevant scientific communities and better scientific environments.

Recently, Crane's concept was revisited by Wagner (2008), who elucidated the emergence of a 'new invisible college' to refer to the contemporary networks established by researchers who, driven by scientific 'curiosity and ambition', 'collaborate not because they are told to but because they want to, who work together not because they share a laboratory or even a discipline but because they can offer each other complementary insight, knowledge or skills' (ibid., 2). According to Wagner, the rise of the new invisible college comes hand in hand with the changes to the structure of science itself, which is comprised of five fundamental forces: i. *Networks*, 'not designed or dictated by anyone, but neither random'; ii. *Emergence*, where networks respond to new information and opportunities from the 'combination and recombination of people and knowledge'; iii. *Circulation*, which imply that *Brains*, knowledge, and information are in constant move; iv. *Stickiness*, that posits that the location where science and innovation take place 'still matters'; and v. *Distribution*, which implies that 'researchers no longer need to be in the same place as the problems they seek to solve' (ibid., 4).

This study thus integrates both perspectives from migration studies and STS to address a more comprehensive approach on the relevance of networks, in order to observe how they work and to draw on some of their main implications in knowledge production, and on skilled migration. The term 'invisible colleges' will be then used to describe the working groups (research groups in academia, and working staff in the private sector) and informal networks established by the Mexican scientists and engineers, and the term 'communities of interest' will be used to refer to the broader scientific/professional and non-scientific/professional networks that surround their working groups, which a good part of their work depends on. Enriched by the STS perspective, networks then become fundamental analytical tools for exploring in greater detail why a skilled worker becomes more or less 'powerful' or 'innovational'

depending on the conditions surrounding him/her, as migration studies have observed (Meyer and Brown 1999; Davenport 2004).

Within the latest waves for dealing with (and understanding) skilled migration, networks have become essential, as they can generate substantial direct and indirect gains for sending countries via employment generation, human capital accumulation, remittances, diaspora networks and return migration (Katseli and Xenogiani 2006). These approaches gave rise to the development of diaspora policies as new alternatives for overcoming the negative effects of skilled migration, different from previous efforts like repatriation, taxation or return-option policies (which will be addressed in section 2.5.3 of this chapter).

Within the contemporary brain drain debate, networks play a relevant role in the growth and expansion of skilled labour worldwide, with important implications for welfare and economic growth. However, the perspective of science *in the making* shows that these networks are increasingly complex and not exclusively comprised of skilled individuals (in this case, Mexican scientists and engineers), but are also characterised by dependent and interdependent relationships between numerous stakeholders, where constant agreements and disagreements are part of on-going, interactional dynamics (Elias 1982). From the perspective of STS, networks are a central part of the structure of science itself (and I may add, of the structure of many other professional fields), which altogether represent relevant implications for skilled migration. As Latour (1987, 125) argued, this approach to science reveals a collective process, often in the need of "Machiavellian" strategies, given that 'every time an ally is abandoned, replacements need to be recruited'. The selectivity processes and strategies deployed for recruiting in receiving countries, as well the motivations of skilled migrants to go abroad in order to become members of such networks, become more evident through the lens of communities of interest and invisible colleges. We will observe how communities of interest and invisible colleges interact with other imbalances between Mexico and the UK in chapter 5 (section 5.3.4).

2.2.5 *The micro-level* approach to decisions and motivations

Given that "push" and "pull" factors failed to explain why some skilled individuals leave, and others do not, Portes (1976) suggested a 'tertiary' dimension to explain skilled migration at the micro-level perspective, where personal and social relationships played a an important role. More recently, these approaches portray skilled migration as the result of, ultimately, a set of individual –or family– decisions, where skilled émigrés employ different mobility strategies to achieve both economic and non-economic objectives (Flanagan 2015). In these analyses, marital status ('partnering'), children ('parenting') and migrants' networks play an important role in selecting the location to move and the temporality of stay (King 2002; Timms and Hughes 2003; Baláz, Williams and Kollár 2004; Ackers and Gill 2008), but also, through a micro-level perspective the rationalities behind the length of stay, the limitations to exit their country of origin, the numerous arrangements needed for the trip, or the challenges to be faced upon their arrival (such as entry regulations and cultural differences) become more clearly observable (Harzig, Hoerder and Gabaccia 2009, 91).

These relatively recent approaches –where decisions are based on numerous personal and professional reasons, individual expectations and personalities— follow what Sontag (2016) calls 'overlapping narratives', and appear as new possibilities for widening our understanding in contemporary skilled migration. This perspective seems consistent with large-scale research, conducted by the British Department of Business, Innovation and Skills (BIS) on career decisions made by graduates from STEM fields, as it found that:

> In simplest possible terms, STEM graduates' career decisions appear to be driven by individual choice rather than any one dominant 'rational' factor such as earnings or career prospects, or a 'practical' factor such as skills mismatch or job availability. Individuals' choices take in a number of 'push' and 'pull' factors and influences which are both personal and employment-related, and which operate over a period of time (Mellors-Bourne, Connor and Jackson 2011, 24).

This study follows this perspective. Without leaving aside the relevance of "push" and "pull" factors for shaping skilled migration, the thesis is focused on analysing the set of decisions, rationalities, life-experiences and professional expectations of the Mexican skilled émigrés, both for leaving Mexico as well as for choosing the UK as their country of destination, as we will observe in my empirical findings (chapters 4 and 5). The

approaches to skilled migration at the macro-level offer important contributions to migratory trends, "push" and "pull" factors, rationalities, and estimations on the number of migrants, but can tell very little on what the life of skilled individuals as "drained brains" is like. As King mentions (2002), it may be more useful to think of skilled migration in terms of a *continuum* of choices and constraints shifting over time, space, lifestyles and lifecycles.

From this focus on the migrants' experience from a micro-level, one of the theories that has become more relevant in contemporary studies on skilled migration is transnationalism. Given its relevance for my study, I address it separately in the next section.

2.3 The transnational perspective: skilled migration and identity

The notion and relevance of transnationalism was unforeseen during the first stages of this research, but several elements regarding a transnationality became evident through the accounts of the *Brains* in the qualitative, semi-structured interviews and their subsequent analysis. In this section, I address transnationalism from three different aspects: firstly, on how it re-emerged as one of the most currently accepted frameworks in contemporary studies of skilled migration. Secondly, I argue about how transnationalism entails important changes to the notion of identity, where subjectivities appear as fragmented and closely interrelated to reflexive processes carried out by skilled émigrés. Finally, I reflect on how transnationalism presents relevant challenges to nation-states and state-bound institutions, particularly for the latest policy approaches to skilled migration regarding the "diaspora option" (section 2.5.3).

2.3.1 Transnationalism and skilled migration

Along with the very development of neo-classical economic theories, other conceptualisations of migratory movements emerged throughout different regions of the world, albeit with less influence. According to Harzig, Hoerder and Gabaccia (2009) and Duany (2011), Randolph S. Bourne first used the term "transnationalism" in 1916 to explain migratory movements to the U.S., and understood American nationality as a

transnationality, a 'weaving back and forth' of individuals from other lands, 'of all sizes and colours' (1916, *in* Harzig, Hoerder and Gabaccia 2009, 64). Similar notions (such as transculturation) emerged in Cuba and Brazil to understand multi-cultural societies where migration had played an important role, and challenged the master narratives of national, homogenous identities (ibid.). Transnationalism, for Wimmer and Glick Schiller (2002), is thus not an offspring of globalisation, but a constant form of modern life that was hidden by an extended, state-bound perspective in migration studies and other disciplines.

By participating in both societies, the émigrés became transmigrants, by living in a process of constant migration exchanging goods, symbols, and information (Appadurai 1996). Even though these émigrés left their countries, their new home appeared as an opportunity for establishing social, economic, or political links that also become transnational. Transnationalism thus meant 'the rise of a new class of immigrants, economic entrepreneurs or political activists who conduct cross-border activities on a regular basis' (Guarnizo, Portes and Haller 2003, 1213).

Notwithstanding, transnationalism also reveals a less romantic face, both for skilled émigrés and for sending countries. On the one hand, qualitative studies show that many transmigrants do not always have the "membership" required to access skilled labour markets in receiving countries, as the work of Peña Muñoz (2013) shows in the case of Mexican skilled émigrés in Canada and Germany, or the case of Muslim Arab immigrants in Brazil, as noted by Voigt Espinola (2016). As for sending countries, even with transnationalism, having a diaspora abroad does not mean that such connections will automatically benefit their economies from such connections, in the form of remittances to the home country or collaborations. In this case study, Mexicans contributions from the UK regarding remittances are mentioned in chapter 4 (section 4.14) and I dedicate chapter 6 to analyse collaboration from a distance. We move on to address the relationship on transnationalism and identity.

2.3.2 Transnationalism and identity

Transnationalism emerged as a refreshing framework to study the connections and experiences established by the émigrés, where migration is not only a complex and

often dramatic process, but a way of constructing new subjectivities (Wimmer and Glick Schiller 2003; Vailati and Rial 2016). In this vein, transnationalism enabled a space for observing reflections: in fields like sociology, anthropology, human geography, or psychology, scholars noted how the forces of capitalism and globalisation enhanced the rapid growth of transnational behaviours in immigrants across the world, which implied profound challenges to how identity is shaped. Subjectivity would be now fragmented, contradictory and multiple, characterised by processes of reflexivity, spirituality, uncertainty, global connections and even a sense of fatalism (Rose 1996; Castells 1999; Beck and Gernsheim 2002). For Anthony Giddens (1991), this new context is comprised of globalising influences and personal dispositions influencing each other, where identity 'is not a distinctive trait possessed by the individual', but a process 'reflexively understood by the person in terms of her/his biography' (ibid., 53).

Identity faced the realities of transcended borders, with individuals constantly reflecting between origins and actual residency and where even the notions of "home", "away", or "abroad" become blurred through the lens of the members of transnational communities (King 2002). These groups may act outside of the state, but within a nation (Castells 1997). Consequently, migration studies have reframed traditional understandings of the interactions between immigrants and their receiving contexts. According to Harzig, Hoerder and Gabaccia (2009), the notion of "assimilation" –by which 'individuals, groups and societies would achieve a common culture'— was replaced in the 1980's by concepts of acculturation, insertion, or adjustment, which acknowledged the preservation of several native cultural elements of immigrants. Under this view, memories of what individuals used to call (and may still call) "home" include likes and dislikes, comparisons, and broader elements to approach their former country critically. This way, transnational forms of memory and remembrance of home and neighbourhoods pave the way towards new self-discoveries on belonging (Beck and Gernsheim 2002; Power 2016).

In this vein, transnationalism emerges as a notion that provides a more reflexive approach to globalisation from the perspective of individual behaviour (Beck 2000). As Beck shows, this cosmopolitan approach is thus better positioned to understand how people's cultural, political and biographical self-awareness change if they no longer

move in a space exclusive to nation-states, but in the space of a world society (ibid., 90). 'Reflexive globalisation' begets new frameworks that are of great relevance for our understanding of skilled migration. Concepts like dual citizenship (the right to hold two nationalities), mobility (as the constant movement of individuals within two or more territories for different temporalities), and transnationalism are notions that brought new interpretations of identity and belonging towards the end of the twentieth century (ibid., 97). In many ways, this cosmopolitan movement appears as an attitude that implies a sense of freedom for individuals to migrate and to expand cultural horizons (Vailati and Rial 2016), but it also can give origin to harmful, disruptive family relations (Parreñas 2015).

However, even though personal dispositions and globalising influences apply to transmigrants in general, choices and reflexivity processes develop differently, according to their "social" and "human" capital (these notions were reviewed in section 2.2.4). As Beck and Gernsheim have suggested (2002), one of the central characteristics of modernity has to do with the aspirations of human beings to become the authors of their own lives, but traditional elements in the shaping of identity, such as ethnicity, social class, gender, sexuality or age continue to be the starting point for approaching individuals, as they 'they inform our practices, relationships, world views and life chances' (Huppatz, Hawkins and Matthews 2016, 5). These elements are still in many ways determinant in the availability of options, which is why Giddens mentions that the poor are still 'more or less completely excluded from the possibility of making lifestyle choices' (1991, 5). As mobility became an alternative to migration, and even as a dimension of migrants' social capital (Oso and Ribas-Mateos 2013), transnationalism appears consistent with previous theories that posit how privileged immigrants (skilled individuals among them) are more likely to enjoy the benefits of these contemporary migration dynamics than their unskilled, generally poorer counterparts. The concentration of benefits and the unequal access to resources in societies (regardless of their multi-cultural background) are important threats for counter-narratives on reflexivity and heterogeneity, related to racism, discrimination, or xenophobia.

Finally, it is important to bear in mind that even though this study is conceptually guided by transnationalism, nationality is still important. As this study will show in

chapter 4 (section 4.10), many of the *Brains* interviewed hold two nationalities, Mexican and British. If one of my research questions is concerned with identifying elements of a transnational behaviour, and how this behaviour affects identity, understanding what it means to be Mexican becomes even more important (Flanagan 2015, 368). For this reason, chapter 4 addresses the reflexivity processes underlying the notions of identity and belonging –symbolically represented as *Mexicanhood*— of my interviewees during the passage of time and distance, as a valuable element to observe the rationalities behind the *Brains´* intentions to stay in touch with Mexico at a distance, and how this relates to broader universalist views about their professional endeavours. This is partly why transnationalism is a complex phenomenon that poses important challenges for state-bound policy initiatives, such as "the diaspora option". Some of these challenges are introduced in the next section.

2.3.3 Transnationalism and nation-states

For Rowse (2016, 99), national identity 'is unique among group identities because it can only exist in a world that has come to be politically organised as an ensemble of nation-states'. For decades, the scholarly debate on the brain drain was framed under this state-bound, 'methodological nationalism', as Wimmer and Glick Schiller (2002) called it. By contrast, the transnational perspective presents tensions between traditional and new subjectivities within individual, societal and political frameworks (Beck 2000; Wimmer and Glick Schiller 2002 & 2003; Tejada 2012; Vailati and Rial 2016), with constant processes of 'de-nationalization and re-nationalization, de-ethnicisation and re-ethnicisation, de-localisation and re-localisation' (Beck 2000, 98). Altogether, these phenomena re-shape the relations between national states and individuals, as Beck shows:

> As more processes show less regard for state boundaries –people shop internationally, work internationally, love internationally, marry internationally, research internationally, grow up and are educated internationally (that is, multi-lingually), live and think transnationally, that is, combine multiple loyalties and identities in their lives– the paradigm of societies organised within the framework of the nation-state inevitably loses contact with reality (ibid. 80).

Because of these constant interactions between the local and the global, transmigrants represent a challenge to be understood and absorbed by nation-states. In addition, growing manifestations from transnational activities, such as political activism or

participating in human rights groups can undermine the authority of nation-states beyond their frontiers, particularly because transnational migrants tend to be elites (Weeks and Weeks 2013). However, as some authors note (Wimmer and Glick Schiller 2002; King 2012), transnational migration studies may give the impression that transborder activities, the growing power of transnational corporations, and the presence of supranational organisations signalled the demise of the nation-state, but for Rowse (2016, 100), 'nation-states could not be more real', as they still:

> Can tax your income, replace your hip for no cost, punish your boss for bullying you, deport your neighbour, build a skateboard park for your son (…) conscript you to fight wars against other nation-states, fill potholes in your street and (in states with capital punishment) legally deprive you of your life (ibid.).

I take Rowse's sarcastic point to emphasise that nation-states are fundamental in societies worldwide, even under globalisation and transnational manifestations. In the case of receiving countries, they can shape migratory inflows in relevant aspects: the number of immigrants who can legally enter their borders, the type of immigrants who enter, and the temporalities of their stay (Cerna 2016). For those nation-states who experience migration outflows, they have assumed a 'state-led transnationalism' (Goldring 2002), which consists of an increasingly active role in fostering ties with their diasporas abroad, by establishing several policies of state outreach, such as attracting remittances and orienting their productive potential; extending political rights (mainly dual citizenship and rights to vote); providing services (counselling, assistance and protection for migrants abroad); or by running cultural events for the preservation of identity (Levitt and de la Dehesa 2013). For the highly-skilled, nation-states have also outlined diaspora policies as a way to connect them with different issues of national interest. I will discuss these policies in section 2.5.3.

In this study, transnationalism occupies a central role for addressing the relevance of Mexican skilled migrants, in the three aspects covered: first, it presents a conceptual framework where skilled émigrés can move with relative autonomy. By moving away from the nation-state as the fundamental unit of analysis, it is possible to observe how identity and reflexivity processes operate throughout time, and how they develop and maintain ties with Mexico –particularly on a personal level—, where their perceptions, feelings and opinions on Mexico allow us to establish how skilled émigrés are, in many

ways, *neither from here nor from there*. I address this point in chapter 4. Second, transnationalism enables more flexible approaches to the networks they make, and how they develop and acquire membership of the communities of interest and invisible colleges they belong to, in Mexico, the UK, or other countries (Foray 2004; Tejada 2012); chapter 5 addresses these connections. And third, transnationalism entails important challenges to be addressed should nation-states wish to "capture" and redirect the knowledge, expertise or networks established by their skilled diaspora: the reflexivity processes of the *Brains* abroad entails frequent criticism towards their government (and even activism from abroad), their needs for recognition, or their requirements for engaging in distant collaborative initiatives, to name a few. These challenges will allow a better analysis of the Mexican diaspora policy in chapter 6. With transnationalism in mind, we move on to the next section, where I address the conceptual framework surrounding the second topic of interest in this study, regarding the professional perspective of skilled migration.

2.4 The professional perspective of skilled migration: the *Brains* as knowledge-carriers

Having observed the definitional challenges and migration theories surrounding the brain drain debate, the discussion is now placed on the role of the *Brains* as 'knowledge-carriers' (Jackson 2012). To widen our understanding of how knowledge-based economies work in late modernity (and why countries seek to attract foreign talent), it is essential to address the associations between knowledge and power, the economic implications of knowledge production, and the consequent asymmetries arising from these endeavours between countries with different levels of development. These asymmetries will enlighten the discussion of the existing "imbalances" between the labour markets of Mexico and the UK, in chapter 5.

On the other hand, the role of the *Brains* as knowledge-carriers is of paramount interest for this (and any other) study on skilled migration. However, asking '*who* are skilled émigrés, and what *kind* of people are they?' has been a gap in migration studies so far, but the literature from STS has problematised the professional identity of scientists and engineers, whose vocation debates between a 'call' based on their

intellectual capacities, and a 'moral equivalence', or the assertion that they are human too. This part addresses this debate as a way to depict the diverse tensions that arise between the vocation, professional identity and personal desires within the reflexivity processes of the *Brains* through their migration experience.

2.4.1 Knowledge, power and asymmetries

Knowledge is power is a well-known saying; a longstanding relationship that has been debated since the times of Bacon and Descartes (Ravetz 2006). When asked 'How can knowledge be a source of power?' Peter Weingart (1982) elucidated two answers: 'Knowledge is power because it provides the means to determine problem definitions, and because it enables those who hold knowledge to determine the solutions of problems' (ibid., 71).

Nowadays, knowledge, power and skilled migration converge within 'knowledge-based economies', a term that emerged from Daniel Bell's (1973) concept of a post-industrial society, and nowadays is a world trend which posits that the production of knowledge acquires a central role in the economic development of a country or region (World Bank 2007); 'specifically, when there is a close relationship between knowledge production and industrial or commercial developments' (Maldonado 2016a). The emergence of knowledge-based economies can be traced back to the unprecedented level of knowledge production during the Manhattan Project in the Second World War, a project that would drastically change the size and scope of scientific research, in terms of cost (2 billion dollars in 1945 prices), government support, links with industry, manpower (over 120,000 people were employed across the project's facilities in the U.S.), organisation, and the close involvement of the military (Hughes 2002). The appearance of *Big Science* brought with itself a new political reality for the scientific endeavour. Weinberg (1965, *in* Shapin 2008) identified the main features of these new associations of science with the state: big funding, big instrumentation, big industry, large-scale organisational conduct, and importantly, big government as its patron. As a result, the accumulation of resources for scientific activity necessarily required the exercise of power (Capshew and Rader 1992), which brought a new era in the relations between the scientific community and governments. Along with the expansion of the

scientific community in the post-war period, Gibbons et. al. (1994) noted a parallel expansion in terms of demand of specialised knowledge of all kinds. For these authors, this gave origin to a new kind of production of knowledge –which they called 'Mode 2'—. For these authors, the previous phase of production of knowledge (or Mode 1) was characterised by being disciplinary-oriented, homogeneous, and autonomous. Mode 2, on the other hand, was characterised by its transdisciplinarity, heterogeneity, social accountability and reflexivity, where:

> (…) The driving force behind the accelerated supply and demand of marketable knowledge lies in the intensification of international competition in business and industry (…) In order to commercialise knowledge, firms have to look for new types of links with universities, government laboratories as well as with other firms (…) The combination of economies not only of scale but of scope with dynamic competition shifts the locus of added value in the innovation process, involving firms more closely in Mode 2 knowledge production'. (Gibbons et. al. 1994, 46).

Under these new links between industry, the government and academia, Gibbons et al. also observed that the application of knowledge becomes more complex, as it demands a continuous exploitation, improvement, and a genuine innovation. As such, knowledge cannot be easily quantified: '…how much is produced –indeed, what we might even mean by "return on knowledge"— we cannot yet say' (ibid., 58). Even though many disciplines are carrying out efforts to estimate knowledge-returns, prevailing difficulties for quantifying the returns of knowledge sheds light over the difficulty of assessing the losses when skilled individuals leave their countries of origin, and studies of the brain drain commonly provide estimates based on a series of indicators around the "losses", mostly related to government spending on education *per capita*, or spending on scholarships for studying overseas (Castaños Lomnitz 2004), but hardly on the social impact caused by sustained investments in R&D (Mercado and Casas 2015).

Science and technology, industry, and government participation would then become sources for a profound transformation of societies, as Bell (1973) envisaged. Industry became an actor of enormous relevance in the scientific map for the production of knowledge (Flanagan and Keenan 1998), 'perhaps the major source of negotiating power in the modern state' (Cozzens and Woodhouse 1995, 535). Nowadays, industry funds and directs research (Dickson 1984), fosters innovation (Gibbons et. al. 1994), enhances intellectual property rules (Ravetz 2006), participates actively in applying

research into the generation of added-value products (Oppenheimer 2010), and of course, recruits skilled individuals (Latour 1987; Vessuri 2008). Such close collaborations brought Slaughter and Leslie (1997) to employ the term 'academic capitalism' to describe the effects of such alliances under knowledge-based economies: universities carry out market-like competition for external funding (grants, funds, university-industry partnerships, investment in spin-off companies, or tuition fees) as well as market-like activities (for-profit activity, patenting, royalty and licensing agreements, among others).

Under this context of an ever closer relationship between industry, the government and academia –known as the "triple-helix" (Etzkowitz, Webster and Healey 1998)— at the macro-level, knowledge appears then as the fundamental condition of highly-skilled individuals within the brain drain debate: not only because of what they know, but as we have seen, because of what their knowledge entails: the ability to acquire, produce, reproduce and commercialise specialised knowledge for the generation of wealth and social welfare in national economies. This is why the first studies on the brain drain were called 'the new growth literature', as they portrayed skilled individuals mainly in terms of their 'human capital' and understood their role as valuable factors for production (Carrington and Detragiache 1998). Under this perspective, skilled individuals –in their condition of 'knowledge carriers'— appear as essential actors for accomplishing a competitive advantages in modern economies. The difference, then, is which countries can incorporate them into their labour force, and which countries cannot do so (at least, under equal competitiveness conditions).

In this vein, the production of knowledge can also become controversial, as it can easily reproduce asymmetries (Fuller 2003; Sismondo 2008), given that 'only a few people, nations, institutions or professions are able to sustain it (…) the production of facts and artefacts will not occur everywhere and for free' (Latour 1987, 179). On the other hand, the notion of *where* knowledge is being produced necessarily points to the idea of concentration. When Merton (1968) discussed what he called 'the Matthew effect' to refer to the different effects caused by the recognition of scientists of considerable repute, he observed a clear stratification in the attraction of the most talented students to leading universities, who host the most reputed scientists but also

hold privileges on the allocation of resources among the higher education institutions in the U.S.: 'the rich get richer at a rate that makes the poor become relatively poorer' (ibid., 62). Under such conditions, the concentration of reputed scientists, talented students, or collaborations between academia, government and industry portrays knowledge having important effects in the reproduction of social asymmetries, particularly in the global South. As production of knowledge grows and becomes more diversified, so does inequality (Arocena and Sutz 2003, 172).

Through this picture, knowledge, power and skilled migration are closely interrelated in modern economies, but as has been noted, such developments come at a price. Asymmetries in the capacities for knowledge production emerge as a prevailing notion to bear in mind within the contemporary debate on the brain drain, particularly from the perspective of the global South. In this study, such asymmetries are developed from Portes' (1976) notion of 'structural imbalances' between the supply of professionals produced by the educational system of a society and the internal demand for their services, and will be applied to the case of the Mexican scientists and engineers in the UK through different issues regarding the development of scientific/professional fields, which includes budgets, funding and investments; infrastructure and equipment; R&D and creative activities; networks, communities of interest and invisible colleges; triple-helix collaborative schemes, and working conditions in chapter 5 (sections 5.3.1 to 5.3.6). These imbalances were constantly mentioned by my interviewees, and constituted important motivations for the émigrés to leave Mexico and to choose the UK as a destination.

The competition for talent worldwide is thus closely related to the role, relevance and implications of knowledge. With this account from STS and migration studies, we have been able to observe how, at the macro-level, important stakeholders (governments, industries, universities and research centres) are engaged in a competition for innovation, cutting-edge research and technology, added-value products, or specialised services, among other objectives. These stakeholders have become particularly close in advanced economies, and altogether shape policies in numerous fields (innovation, science and technology, higher education, immigration) that have a profound effect on the pursuit of attracting/retaining skilled émigrés.

The role of knowledge, power and asymmetries provide a valuable context to suggest that skilled migration is *here to stay*, due to its implications in knowledge production. However, as this research is mainly interested in the phenomenon as a human experience, in the next section I address a frequently underexplored issue within the brain drain debate, regarding the tensions in the professional identity of scientists and engineers, namely, on the notions of vocation and moral equivalence.

2.4.2. Coming down from the *Ivory Tower*: the vocation and moral equivalence of scientists and engineers

In migration studies, the relevance of émigrés as knowledge-carriers lies within their very existence. Notwithstanding, these studies tend to focus excessively on the role of skilled émigrés for achieving social welfare and development, under what seems as a mythical portrait of scientists and engineers as "guardians of the common good", whereas their human condition is often left out of the scope of analysis. For this reason, this study resorts to STS literature, in order to fill this gap and provide another perspective of scientists and engineers as individuals who experience relevant reflexive processes between the notions of vocation and moral equivalence.

In his book *The Scientific Life,* Steven Shapin (2008) narrates how Albert Einstein's first visit to the U.S. in 1921 –the same year he was awarded the Nobel Prize— became an 'American obsession', which did not focus on the utility of his work, but on the contrary, 'Einstein came to represent a pure form of ideal disengagement, humility, gentleness, and peaceableness' (ibid., 63). In this regard, Einstein himself wrote: 'It strikes me as unfair, and even in bad taste (…) to select a few individuals for boundless admiration, attributing superhuman powers of mind and character to them' (1954 [1921], *in* Shapin 2008a, 49). According to Shapin, this was one of the first assertions of the century that science had a human face, and that scientists were human too.

A few years before Einstein's visit to the U.S., Max Weber gave a speech on *Science as a Vocation* at Munich University, where he depicted the two faces of science. On the one hand, he established an analogy of science as the Sun in Plato's *Republic*: Science is the truth, and as a result, 'scientific work is chained to the course of progress'; on the other, he cited Tolstoi's predicaments with science to acknowledge its limits:

Science could not answer the question of *'What shall we do and how shall we live?'* and the notions of science as the 'way to true art', the 'way to true God', or the 'way to true happiness' were historical illusions (1958, 120-21). Weber also outlined two conflicting views for men and women of science: scientific vocation implied not only the question of a 'calling for science', but a question to be sought within the total life of humanity; yet, the use of science as means to control life 'do not and must not' lead scientists to claim to be 'masters in the vital problems of life, or even to be leaders in matters of conduct' (ibid., 128). The scientific endeavour and the role of scientists were being put in a balance.

Soon after the Second World War, and in view of the profound impact caused by weapons of mass destruction from the Manhattan Project, scholars intensified the debate between what science '*is'* or '*ought* to be' (Kuhn 1962; Price 1963; Capshew and Rader 1992). To some, science would help to preserve peaceful and free societies, with the capacity to discipline political action and even set limits to government activity, but to others, crude realities (related to scientific racism, sexism, human experimentation, chemical, biological or nuclear warfare) represented harsh evidence against the narrative of scientific progress and universalism (Thorpe 2004; Ezrahi 1990 & 2003; Ravetz 2006). After the emergence of Big Science*,* the 'golden age' myth of scientific autonomy, intellectual freedom, and normative structures became a contradiction between the past and the present (Holden 2015), and the role of scientists took a different form: scientific activity, which had initiated its professionalisation in the nineteenth century, would become an expanded occupation. Consequently, scientists became simply job-holders, 'as necessary as, but not more necessary than, any other' (Bernal 1954, *in* Shapin 2008, 51). These post-war developments paved the way for what Shapin (ibid.) called the 'moral equivalence' of scientists, or the assertion that scientists not the possessors of some kind of moral superiority.

For Cozzens and Woodhouse, larger budgets and politics caused a decline in the image of scientists, 'from guardians of the common good producing objective knowledge' into 'hired brains of special interests and lobbyists for their own' (1995, 533). In order to analyse the role of skilled migrants in knowledge-based economies, and to widen

our understanding of their reasons and motivations to leave their countries of origin and remain abroad, I consider it essential to bear in mind how scientists and engineers deliberate between a professional vocation and a moral equivalence. In migration studies, too much pressure, and often-unrealistic expectations seem to be put on the back of skilled émigrés, often overlooking the role of their humanity. As Castaños-Lomnitz (2004) argues, because of their elite professional status, the departure of skilled migrants is commonly seen as a desertion, and other recent philosophical approaches on skilled migration, such as that made by Michael Brock (*in* Brock and Blake 2015) continue to advocate for developing countries to impose coercive measures on their skilled individuals, in order to guarantee that they compensate their country's investments. However, the STS perspective enables us to problematise the humanness of scientists and engineers, based on the realities of modern science (and I would add the corporate world): their networked character and their widely international condition (as noted by Fukuyama, 2008) that actively promotes mobility. As Seaborg noted, upon the virtue and public authority of science as an institution, scientists debate between their greater intellectual status (within their specialities) and their human status, where they are subject to the same shortcomings, the same desires, the same wants and the same drives as anyone else (Seaborg 1996 [1955], *in* Shapin 2008, 77).

For this reason, the perspective of the moral equivalence is highly influential in this study, as it facilitates skilled individuals to *come down from the Ivory Tower,* thus enabling clearer observation of important constituents of their professional identity. In this study, I focus on issues like personal vocations, professional expectations, desires, contributions, and even feelings under more equal terms with the rest of migratory groups. From these issues, and from understanding the existing asymmetries between Mexico and the UK that we observed in the previous section, it is possible to understand in a better way, how and why the decisions to leave Mexico and remain in the UK take place.

Having observed the complex relationships between knowledge, power and asymmetries (or imbalances), and the tensions between professional/scientific vocation and the moral equivalence, we move on to the next section, where I address

the last topic that guides this study conceptually: the policy perspective of skilled migration and the brain drain.

2.5 The policy perspective

From its emergence in the 1960´s, the different definitional challenges to conceptualise skilled migration and the brain drain (addressed in section 2.1) have shaped different policy initiatives to train, attract or retain talent, both from sending and receiving countries. In the UK, during the peak time of fears that a brain drain was taking place in the country, in 1963 Lord Hailsham (who popularised the term), as Minister of Science, wrote a letter to Lord Todd, the chairman of the Advisory Council on Scientific Policy (ACSP), where he stated:

> My own view is that in modern conditions nothing but good can come from a free interchange of scientists (...) between all civilized countries. But clearly a net emigration of scientists (except perhaps in discharge of our duty towards less developed nations) gives rise to problems of policy which Government would do well to consider seriously[12]

In this letter, it is possible to observe how even during those first times of framing the brain drain as a potential threat, Lord Hailsham's opinion expressed a mix of positive views on scientific exchange, moral duties to the affected countries (generally developing ones), and a call for policy action regarding the migration of scientists, given a prevailing fear of losing contact with skilled émigrés. The next sections address the main policies outlined by sending and receiving countries, with particular interest in the "diaspora option", where collaboration at a distance is set out as an alternative to mitigate the negative effects of the *Brains´* departure, as well as in scientific diplomacy, a term of relatively recent use within STS and the scientific community to address long-distance collaborative initiatives.

2.5.1 Emigration and immigration policies

Simultaneously to the rise of the brain drain debate in the UK, several other countries were going through similar experiences in the 1960s, and international organisations and governments around the world (particularly in peripheral countries) started to

[12] The National Archive. CAB 132/167. Copy of a letter dated 18th March 1963 from the Minister of Science to Lord Todd (*in* Balmer, Godwin and Gregory 2009, 346).

manifest concerns and take action. One of the first policy efforts made consisted of repatriation, that is, a series of calls and incentives to skilled émigrés –often under nationalistic claims– with the goal of persuading them to return to their countries of origin. Through the reinsertion of their expatriates into their labour market, these policies sought to boost the industrialisation of sending countries. According to Meyer and Brown (1999) the 'return option' or repatriation policies that were implemented from the 1980's had good levels of success in newly-industrialised countries (such as Singapore or South Korea) as well as in big developing countries (such as India and China). The common formula in these cases relied on significant investments in science and technology infrastructure, and in the contributions from their human resources. On the contrary, these efforts were significantly less successful –or failed– in countries that either lacked consistent repatriation strategies, that did not invest sufficiently in their infrastructure, or that did not offer the proper incentives for their skilled émigrés to return.

A second policy wave had to do with emigration policies. According to de Haas and Vezzoli (2011), there are three types of emigration policies: on the one hand, policies with minimal regulation (or *laissez-faire*) characterise governments that do not consider emigration as a threat. These policies have been mostly employed in countries that either receive a good number of skilled immigrants, or as strategies for "*brain* storage" for potential subsequent use; Hugo and Stahl (2004) referred to the deliberate plans of countries in Asia (mainly China), to facilitate the departure of many skilled workers. A later contribution from Katseli and Xenogiani (2006) showed that economic growth and larger investments in research and development in these countries reinforced the repatriation of these "stored *Brains*", and even the recruitment of additional foreign *Brains*. The second type mentioned by de Haas and Vezzoli are 'encouraging emigration' policies, adopted by governments that wish to release economic pressures, reduce the chances of social agitation (Grubel 1966), as well as taking relatively immediate benefits through remittances. For decades, Mexico has been a good exponent of this group, since it has benefitted greatly from the remittances sent by its expatriates abroad, up to the point where remittances constitute the second most important income source of the country, only after oil

(Cuecuecha and Pederzini 2012). I return to the issue of remittance contributions in chapter 4 (section 4.14), where we will observe the limited contributions of skilled émigrés in this particular aspect.

The last type of emigration policies mentioned by de Haas and Vezzoli (2011) are 'restrictive emigration' policies, used by governments to prevent or limit the exit of certain groups, including of course, skilled individuals through retention methods (Hugo and Stahl 2004) or taxation schemes, such as the Bhagwati tax, which aimed to collect some kind of compensation from highly-skilled expatriates themselves or from receiving countries (Bhagwati and Dellalfar 1973; Bhagwati 1976). However, numerous factors, like the respect for human rights –and the defence of free citizen mobility—, or relevant global trends (such as the growth of knowledge-based economies, the expansion of skilled labour markets, the changes in the structure of science, and the effectiveness of attraction policies in modern economies I have addressed before) complicated the extent to which restrictive emigration policies could effectively 'influence the volume, origin, destination and composition of emigration' (de Haas and Vezzoli 2011, 6). In the end, these approaches provided evidence that conceiving highly-skilled individuals as merely capital assets –as neo-classic economic approaches suggested— was only a part of the phenomenon, and ended in failure given its limited capacity to retain skilled individuals (Meyer et. al. 1997; Meyer and Brown 1999).

On the other hand, different immigration policies have also been outlined in receiving countries (mainly advanced or central economies). As Ferro (2006) and Vessuri (2008) suggest, the emergence of knowledge economies acted as generators of a new labour mobility, in constant need for qualified professionals. In this regard, attraction, retention and successful assimilation strategies are key issues for receiving countries (Iredale 1999), who encourage or dissuade skilled migratory flows through different immigration policies, mainly in the form of special visas for highly-skilled individuals with varying temporalities, as a reflection of global trends of unstable work (and uncertain stays).

2.5.2 Non-migratory policies and skilled migration

From my perspective, other non-migratory policies must also be considered in the contemporary brain drain debate, as they appear closely interrelated in shaping contemporary skilled migration. Higher education, for instance, plays an outstanding role in attracting young talent from abroad, as the countries that are more successful at allocating the largest numbers of foreign *Brains* also tend to be those who have the best universities: according to the Times Higher Education World University Rankings 2016-2017, an outstanding number of 63 universities in the U.S. are in the top 200 best universities worldwide; 32 in the UK; 22 in Germany; 13 in the Netherlands; 9 in China; 8 in Australia and Canada; and 7 in Switzerland[13]. As we saw with migration theories (in section 2.2.1), reputation, internationalisation, and the quality of academic programmes play a decisive role in students' motivations. By sharp contrast, none of the Latin American universities managed to access the top 200. These central countries also show important competitive advantages in forming communities of interest and invisible colleges than those countries in the periphery: according to UNESCO (2014), only five countries (U.S., UK, France, Australia, and Germany) attract 1.8 million international students to their universities, and concentrate half of the total international student mobility worldwide; again, none of the Latin American countries is among the first 20 destinations. In chapter 4 (sections 4.2 and 4.3), we will observe how the actions and experience of Mexican skilled émigrés are consistent with these "pull" factors at the macro-level, both for enrolling on a postgraduate programme in British universities, and for pursuing work opportunities in the UK thereafter.

On the other hand, by articulating a series of policies in science, immigration, innovation, labour and education, official reports reveal clear intentions from developed countries to continue recruiting a skilled workforce from abroad, as strategies to secure their levels of prosperity. In 2001, a report from the European Commission (EC 2001) outlined a series of strategies in the region for recruiting *Brains* from abroad on a more permanent basis, and the possibility of introducing an "EU Blue Card" was envisaged for the whole region, which would enable highly-skilled non-EU

[13] "Times Higher Education World University Rankings 2016-2017". September 2016.

nationals to access the entire European labour market (Day and Stilgoe 2009); Sweden, on the other hand, approved a flexible system for skilled migrants and students from abroad to work or study, and for companies to recruit labour from outside Europe (Government Offices of Sweden 2009); in Germany, the Federal Ministry of Education and Research of Germany stated that: 'Only countries that train sufficient numbers of highly qualified persons, and that are attractive for foreign specialists, can succeed in the international competition for the best minds' (BMBF 2005, *in* Ackers and Gill 2008, 161). In the UK, the Roberts Report (2002) highlighted the need of human ingenuity for making discoveries and new products, which meant that R&D activities were critically dependent on scientists and engineers, and its supply would be compromised in view of a skills shortage in these fields in the country. A decade later, the UK Coalition government outlined its plans for growth, where it established that British 'science and innovation can only be as good as the people that it can attract, educate, train and retain' (BIS-HM Treasury 2014, 6). As it has been argued, the strategies outlined by these non-migratory policies contribute to the idea that skilled migration is *here to stay*.

In sum, as de Haas and Vezzoli (2011) note, emigration and immigration policies (and I must add, non-migratory policies) can be seen as the result of a series of agreements between multiple groups with different interests, 'with the balance of power being generally in favour of (predominantly wealthier) immigration countries' (ibid., 27). One of the main interests is related to sustainability, particularly in the context of aging population in countries –as the case of the U.S. and most European countries—, who will eventually need to fill empty spaces with young scientists and engineers from abroad. As a result, immigration polices are focusing on international recruitment and encouraging scientific mobility, frequently overlooking the negative externalities these initiatives may beget, such as putting at risk the generation-transitions of skilled workforce at sending countries (generally less developed economies) in entire regions like Eastern Europe, Africa, Asia or Latin America. Within the policy options, diaspora policies have emerged as the latest wave of approaches to tackle the negative effects of skilled migration. I address them next.

2.5.3 The latest wave: the diaspora option and scientific diplomacy

Given the limited results obtained by repatriation and restrictive emigration policies, it was clear that sending countries needed new alternatives to engage their skilled individuals, particularly in view of the growing dominance of advanced economies to attract and retain brainpower. For these reasons, the "diaspora option", or diaspora-engagement policies, became one of the most recurred possibilities.

In the previous decades, diasporas (a term used originally to refer to the Jewish and Greek historical dispersion and cultural interactions) were observed to be 'socially interdependent but spatially dispersed', with common links between one another and their place of origin (Harzig, Hoerder and Gabaccia 2009, 81). They were only later considered as 'mirrors of national development, reflecting the migratory pushes and the pull of the global economy' (Kuztnetsov and Sabel 2006, 5). Given the needs for more innovative ideas to tackle the negative effects of skilled migration, diasporas became the centre of attention of migration policies.

Diaspora policies emerged in the late 1980s and early 1990s as a refreshing policy approach that based its efforts on the rapid growth of ICTs, where governments in different regions of the world aimed to reinforce national policies by re-attracting educated expatriates through return options on the one hand (Gaillard, Gaillard and Krishna 2015), and by creating links and networks with their skilled diaspora abroad on the other (Meyer and Brown 1999). Diaspora policies reckoned that 'expatriates are not likely to return, at least in the short term, but represent a significant resource wherever they are located' (Davenport 2004, 624), and focused on the opportunities of networks as flexible, adaptive structures (Castells 1999).

In many ways, diaspora policies were inspired by the longstanding diaspora movements in China and India, where the different contributions from their expatriates were essential in the economic growth of those countries. On the one hand, China's diaspora network largely focused on manufacture, low-wage operations and vast amounts of foreign direct investment contributions (Devane 2006). Conversely, the success of the Indian diaspora relied on its role in developing the software industry of the country, where transnational innovation networks and the

possibilities from ICTs facilitated the trade of data, mutual observation of outcomes and creating links with their compatriots. The connections and expertise of U.S.-based Indians on American quality standards, as well as their awareness on the needs of the software industry in the U.S. portrayed a remarkable win-win situation of skilled migration, for the benefit of both sending and receiving countries (Kuznetsov and Sabel 2006; Devane 2006).

Nevertheless, for some authors, the success of Chinese and Indian diasporas were partly the product of 'fortunate accidents' that are unlikely to be reproduced at other latitudes. In China, Hong Kong's reintegration to the country boosted the interest of businessmen in Hong Kong to liaise with the Chinese government, mainly through large foreign investments and moving manufacturing industries to China, in order to secure political agreements and buy protection for their assets (Naughton 1999), whereas India's longstanding tradition in producing scientists and mathematicians, the promotion of skilled individuals to executive positions in American ICT companies, and a governmental change from protectionism to more relaxed regulations played a vital role in the development of the country's IT and business outsourcing industries (Pandey et. al. 2006; Kuznetsov and Sabel 2006). Other diasporas in the world may not have the same economic power to influence corporate investments, outsourcing plans and other large-scale business or scientific decisions back home (Devane 2006).

At other latitudes, the Red Caldas in Colombia (created in 1991) and the South African Network of Skills Abroad (SANSA, created in 1998) pioneered stated-led, diaspora-engagement policies, with the goal of establishing more connections with their skilled diasporas abroad (Meyer 2001; Tejada 2012). Through the use of ICTs, Red Caldas and SANSA sought to promote collaborations and facilitate transactions between skilled expatriates and their counterparts in Colombia and South Africa. Years after being implemented, Meyer and Wattiaux (2006) conducted an empirical evaluation of these diaspora networks (Red Caldas and SANSA), and found that the diaspora option was a feasible option as a new approach to face the brain drain, as there was a 'real existence of off-shore extensive human resources that could be mobilised by the country of origin', which resulted in the development of joint-collaboration projects (partly virtual), the creation of enterprises, training management and mentoring, and a

series of consultation activities, among others (ibid., 8). Although the Colombian network only reached around 800 members from 25 countries (around 10% of total estimated skilled émigrés), and the South African around 2,500 (around 25%), the progress made was perceived worthwhile and promised a good expansion in the years to come.

However, as some studies showed (Davenport 2004; Meyer and Wattiaux 2006; Izquierdo 2008; Rannveig Agunias 2009), the downsides of these initiatives were related to the longstanding difficulties of estimating the number of expatriates to be contacted (as we observed in section 2.1.2), the temporality of their residence abroad (we observed in section 2.3.3 the challenges of transnational behaviour to state-bound policy approaches), the collection of proper information on their skills and knowledge, the difficulties of finding the right channels to communicate, and proper implementation strategies by governments. In the case of the Red Caldas, Tejada (2012) observed limited relevance in terms of the projects created, which did not correspond to the outcomes expected. The lack of relevant results, the excessive centralisation of its operation, and the progressively diminishing institutional enthusiasm caused both initiatives to cease to exist (Tejada, ibid.; Gaillard, Gaillard and Krishna 2015).

The Chinese and Indian successes show that there is no single formula for a successful engagement, and the Red Caldas and SANSA, ground-breaking diaspora policies in their time, ended up in failure due to lack of funds, institutional and policy flaws, a limited ability to motivate skilled émigrés to take part in collaborative initiatives, and because of the limited results from such collaborations. The lessons from Red Caldas and SANSA will also be considered in the discussion of the MTN, in chapter 6.

Albeit with numerous challenges, elements like the increasing prevalence of international communication, ICTs and the growing interest of sending countries in their diasporas continue to advocate for a new perspective of migration, from a “loss” (or “zero-sum game”), to an opportunity for co-development where diasporas can contribute to their countries of origin ‘through their transnational experience, cultural hybridization and existing professional networks’. (Tigau, Pande and Yuan 2017, 192).

From this perspective of the "diaspora option" as a feature of co-development, a different portrait of skilled émigrés is suggested by both migration studies and STS. On the one hand, Tomiczek (2011) analyses the notion of 'diaspora diplomacy' as a new dimension of diplomacy, where émigrés can become promoters of the image, values and other cultural elements of their countries of origin. In a similar vein, STS has focused on the concept of 'scientific diplomacy' as an extension of a country's 'soft power'[14], which builds on common interests and values to attract, persuade and influence (The Royal Society 2010a). From this viewpoint, scientific diplomacy resorts to science, technology and innovation as means to achieving different development goals, and includes both informal (people-to-people) and formal (governmental) relationship-building, in three different dimensions: i. *Science in diplomacy*, or the role of science as a mechanism to inform issues of regional and global concern, such as global environmental threats, public health, or migration; ii. *Diplomacy for science*, or diplomacy as a mechanism for advancing a scientific goal, particularly expensive research programmes that need the participation of multiple countries (such as the European Organization for Nuclear Research, CERN, or the International Space Station); and iii. *Science for diplomacy,* or science as a mechanism to build bridges between countries as alternatives to develop positive engagements between countries that have strained, limited, or non-existing relationships, such as the project SESAME in the Middle East[15] (AAAS, 2009; The Royal Society 2010a).

As we have seen, diaspora policies offer many advantages by conceiving both skilled migration and skilled émigrés on more flexible grounds. Tackling mobility patterns ('brain circulation') instead of fixed migration ('brain drain'), or the presence of "transmigrants" instead of "drained brains" enable a more suitable approach to long-distance collaborative initiatives. In addition, diaspora and scientific diplomacy can help build trust and foster intercultural understanding (Royal Society 2010a), with the *Brains* as a sort of "Ambassadors" between sending and receiving countries. However,

[14] A term from Political Science, 'soft power' was coined by Joseph Nye (1990), to describe the ability of a country to shape preferences of others through persuasion, appeal or attraction strategies and methods, based on political values, culture, tech products, foreign policies, or credibility. In 2015, a Global Ranking of soft power ranked the UK in the 1st place worldwide; Mexico ranked 29th (McClory 2015).

[15] SESAME is a synchrotron developed between nine countries in the Middle East, where political conflicts are commonplace: Israel, Iran, the Palestinian Authority, Turkey, Cyprus, Jordan, Bahrain, Egypt and Pakistan ("Open, Sesame. Particle accelerators". *The Economist,* December 26th, 2016).

both diaspora policies and diaspora/scientific diplomacy often overlook the numerous challenges that professional/scientific collaborations entail, and perhaps more important, they have underestimated the thoughts and views of the migrants themselves. In other words, very few diaspora studies have concentrated on the brain drain from the perspective of the *Brains*. This is highly relevant, as empirical evidence from different countries[16] shows that diasporas do not always sympathise with their countries of origin (Tigau, Pande and Yuan 2017), which may constitute a serious challenge for the success of the "diaspora option".

One of the main questions of this study has to do with the feasibility of long-distance collaborative initiatives with the skilled Mexican diaspora as an alternative to mitigate the negative effects of their departure. For this reason, chapter 6 is dedicated to investigate, firstly, whether my interviewees are engaged (or have been engaged) in collaborative initiatives with Mexico from the UK. From those findings, it will elaborate on the challenges they face for engaging in these kinds of initiatives, what are the main facilitators/inhibitors for such collaborations to take place, and finally, it will analyse the role of the main Mexican diaspora-engagement policy, the Mexican Talent Network, in tackling such initiatives. It is argued that a bottom-up approach, such as this one, can inform diaspora policy studies with valuable ideas and recommendations from first-hand experiences.

Concluding remarks: perspectives on skilled migration and the brain drain

What insights emerge from this theoretical framework on skilled migration and the brain drain?

First, that the conceptualisation of the brain drain has constantly evolved throughout the last decades, a product of numerous changes in international migrations since the late 1980s, where a profound transformation in the temporality (and certainty) of stay is influenced by trends at the macro-level –globalisation, structural conditions of modern science and the corporate world, unequal capacities of labour markets for the

[16] The work of Sirkeci and Cohen (2016) addresses the case of Turkey; Boccagni (2014) the case of Ecuador, and more recently, Moro-Martín published a column for *Nature* in the case of Spain ("How dare you call us diplomats". Nature 543, March 2017).

highly-skilled in developed and developing countries, the attractiveness of global cities, a growing flexibility and instability of employment, or declining transportation costs, among others— as well as trends at the micro-level, where the mobility of people is nowadays more dynamic, unstable and often unpredictable. The notion of "loss" of skilled individuals is therefore contested by more recent approaches. We know now that skilled émigrés are able to develop circulatory moves, and in many cases return (temporarily or permanently) to their countries of origin. Chapter 4 analyses the elements of a transnational behaviour among my interviewees, as a way to provide empirical evidence on how these trends at the macro-level are experienced in the case of the Mexican scientists and engineers in the UK.

Second. Assessing the brain drain is not a simple task, as there are important variations depending on the sources consulted, due to conflicting concepts on *who counts as a Brain*, limited capacities of governments to keep up-to-date or detailed information on their locations, or to the complexities for tracking dynamic migratory movements. Estimations, such as those made by Beine, Docquier and Oden-Defoort (2011), or in the case of Mexico, by Delgado Wise et. al. (2015), and Tuirán and Ávila (2013) frequently encounter these methodological issues. Nevertheless, as we could note in the introductory chapter of this study, scholars estimate that Mexico has more than 1 million skilled émigrés spread around the world (predominantly in the U.S.). Around 8,470 of them live in the UK. This is indeed a worrisome scenario that calls for action. On the other hand, as Gibbons et. al. (1994) show, the application of knowledge is subject to different elements which cannot be easily quantified. These 'returns of knowledge' bring additional challenges for assessing the extent of the "loss" of skilled émigrés. For these reasons, the perspective of this study goes beyond the numbers in order to recover the experiences of the people behind them: more than asking *how many have left,* this study is primarily concerned on *who has left*, and *why.*

Third. By focusing on people rather than numbers, transnationalism appears as a refreshing framework to revisit the migrant experience, under numerous aspects. It allows the identification of blurred boundaries on the migrants' perceptions of "home", "away" or "abroad", from which identity and belonging are continuously reflected through experiencing mobility between two or more places, thus paving the

way for new subjectivities (Vailati and Rial 2016). These concepts illuminate my empirical findings in chapter 4. On the other hand, transnationalism enables an approach to the professional connections made by skilled émigrés in both countries. Chapters 5 and 6 address such connections from the perspective of professional experience. Lastly, transnationalism allows an observation of the challenges that transmigrants represent for nation-states and for policy-makers, given that their mobility, choices, and opinions can be difficult to tackle by state-bound initiatives. In this regard, the 'elephant in the room' (de Haas and Vezzoli 2011) for discussing the effectiveness and the impact of policies relies on the fact that migration is driven by macro and micro-contexts that go beyond the scope of migration policies, and even the power of individual states. However, despite globalisation, transnationalism, or their privileged status, skilled émigrés do not move in dislocated, borderless spaces (Sontag 2016). Nation-states, through immigration, emigration and other related policies are fundamental actors in shaping skilled migratory flows worldwide. Moreover, as authors like Rowse (2016) and Flanagan (2015) show, nationality is still important. Transnationalism provides a valuable framework to identify how the notions of identity and belonging (or *Mexicanhood,* for the purposes of this study) are influenced and affected by the passage of time and distance, where several reflexivity processes take place. These processes will be addressed in chapter 4.

Fourth. Relevant notions from STS can widen our understanding on the émigrés' decisions to leave and/or to remain abroad. My interest in transcending 'politically correct' views on the brain drain, as Gaillard and Gaillard (1997) noted, guided my approach to skilled individuals on more humane grounds, without *Ivory Towers.* In this study, the role of skilled émigrés as 'knowledge-carriers' is confronted by Shapin's (2008) queries around *who are scientists, and what kind of people are they?* By addressing the historical processes that shape modern science, STS allows an observation of skilled individuals' conflicting professional identity, which debates between a vocation in Weberian (1958) terms, where 'a superior call for science' entails normative views, and a 'moral equivalence', where scientists and engineers appear as humans with the same desires, expectations and motivations as anyone else (Shapin, ibid.). Migration studies tend to focus on the relevance of human capital for

social welfare and development, and consequently, too much pressure (and often unrealistic expectations) are often placed on the back of skilled émigrés. Without underestimating their intellectual capacities (that is what motivates this research in the first place!), STS fills this gap by providing a broader framework to identify the tensions arising within the professional identity, vocation, and personal desires of the *Brains*. In chapter 5, the moral equivalence of my interviewees is analysed in the context of their experience in the UK, where their receiving context also plays a fundamental role in their professional motivations to remain.

Fifth. STS has also dedicated particular attention to the role of knowledge, its associations with power and its implications in modern economies (hand in hand with the government, academia and the corporate world). From the perspective of STS, knowledge production can become controversial, as it greatly depends on economic and political power that is only available in certain countries. Consequently, the concentration of knowledge has important effects in the distribution of benefits and wealth (Latour 1987; Arocena and Sutz 2003; Sismondo 2008). In migration studies, Portes (1976) was among the first to posit that skilled migration was a consequence of 'structural imbalances' between the supply of new professionals trained, and the internal demand for their services. Likewise, the dual labour market theory emphasised the structural demand for foreign labour in more advanced countries (Arango 2000), and the world systems theory has studied the different effects provoked by these imbalances in developed and developing countries (Arocena and Sutz 2003), where externalities (such as the negative effects from skilled migration) in peripheral countries are frequently overlooked by the countries at the centre (Vessuri 2014). These notions, on asymmetric power relationships and structural imbalances behind the production of knowledge, are highly influential for guiding my findings on the *Brains'* perceptions regarding the differences between the labour markets of the UK and Mexico, in chapter 5.

Sixth. From different perspectives, STS and migration studies have analysed the relevance of networks within skilled migration. On the one hand, STS literature is able to grasp more deeply how scientific/professional networks operate, how they are formed, and their effects on knowledge production. As Crane (1972) and Wagner

observed (2008), scientists nowadays are engaged in flexible, growingly complex networks, or 'invisible colleges', which facilitate departures and influence decisions to remain abroad. Similarly, Latour's (1987) concept of 'communities of interest' portrayed the interactions between broader scientific and non-scientific networks working together. From the perspective of science *in the making*, skilled émigrés are essential, but are certainly not the only relevant actors, as other stakeholders (politicians, policy-makers, other scholars, businessmen/women, or civil society) are also key players in making highly-specialised activities *relevant*, and consequently to boost a knowledge-based economy. In a similar vein, migration studies have emphasised that skilled workers are highly dependent on the conditions surrounding them (Meyer and Brown 1999; Davenport 2004). However, despite its openness, scholars have stressed that such elite networks are not accessible to all: a "membership" is required, and the levels of participation also depend on their capacities to contribute to knowledge production. In this study, invisible colleges and communities of interest are of paramount relevance. Chapters 5 and 6 identify aspects related to the role of these networks in my interviewees' professional endeavours, from which potential collaborations can be more easily set as ways to outline alternatives to counter the negative effects of skilled migration.

Seventh. Policies outlined on skilled migration and the brain drain can be divided in two conflicting perspectives, between sending countries (generally developing economies) that suffer from the exodus of their skilled individuals, and receiving countries (generally developed economies) that attract/retain such skilled individuals into their knowledge-based labour markets. As noted in section 2.5, these policies predominantly favour wealthier countries, where an implicit *realpolitik*[17] factor has always surrounded the debate on the brain drain, motivated by the articulation of immigration and other non-migratory policies (in science, technology, higher education or labour fields) in developed economies. These policies show their clear intentions to continue attracting skilled workforce from abroad, as central strategies to sustain their labour markets and guarantee their levels of prosperity. From a political

[17] From German, *realpolitik* is a term commonly used in political and diplomatic environments to refer to realistic circumstances and factors, such as power or economic asymmetries, by which decisions and arrangements are made, rather than normative, ideological, ethical or moral premises.

perspective, the brain drain constitutes a tension between the development and the economic agendas (Ackers and Gill 2008), where it can be expected that the most powerful economies (followed by the emergent economies) will continue to foster such attraction policies, regardless of its effects in sending countries. As addressed in section 2.5.1, policies inspired by 'politically correct' views on the brain drain, which supported compensation or taxation proposals relied on commitments by the receiving countries under the principle of fairness (Bhagwati and Dellalfar 1973; Ahmad 2004). The *realpolitik* shows us that these well-intentioned proposals have not actually happened, and are not likely to happen in the years to come. This study therefore builds on from the idea that under the current political, social, and economic landscape, skilled migration is *here to stay*.

Eighth. From reviewing the numerous attraction, repatriation, retention, diaspora, and other immigration and emigration policies, it can be concluded that there is no such thing as a single formula for success to be followed by governments to tackle skilled migration. The experience of sending countries like China or India showed that skilled diasporas can be approached in different ways, and play different roles. Moreover, by contrast with often-deterministic views from dependency theories and North-South debates, these countries (and other smaller Asian nations, like Singapore or South Korea) offer important evidence that something CAN be done about the brain drain and that bridges CAN be built with a country's diaspora. However, as the editorial of the special issue of *Science, Technology and Society* (1997, iii.) argued, 'developing countries no longer sail in the same boat', and alternatives necessarily require long-term plans, besides actively connecting with their skilled workforce abroad. Despite the clear presence of *realpolitik* factors in the brain drain debate, diaspora-engagement policies constitute relevant alternatives for a new conceptualisation of skilled migration as an opportunity for co-development, where the *Brains* abroad can contribute with skills, knowledge, expertise and valuable scientific/professional networks that sending countries lack. In migration studies and STS, the notions of 'diaspora diplomacy' and 'scientific diplomacy' contribute to thinking of ways to build communication channels, or bridges, between two relatively distant countries, such as Mexico and the UK, in both informal (person-to-person) and formal (bilateral

government agreements) ways. However, these notions may also be reduced to good letters of intent, as they seem to overlook the thoughts and views of the "Ambassadors", who are frequently not sympathetic to the governments of their countries, an appear reductionist with the challenges of building bridges with skilled diasporas. For this reason, chapter 6 addresses key challenges faced by diaspora-engagement policies, and explores the views and concerns expressed by the *Brains*, particularly regarding underexplored issues in the literature, such as politicisation, autonomy, and legitimacy.

And *Ninth*. Diaspora-engagement policies, as one of the latest efforts to mitigate the negative aspects of the brain drain, recognises skilled migration as the result of complex factors at macro and micro-levels, which are often difficult to process within the nation-states' spheres of action. In this regard, the Red Caldas in Colombia, and the SANSA network in South Africa, show that even under the most recent approaches to skilled migration, the need for consistent support, funding, proper incentives for engaging skilled émigrés in collaborative initiatives must be taken in close consideration. I build on from these ideas –in the sense that something can be done regarding skilled migration, but building bridges with skilled diasporas is not a simple endeavour– for investigating if my interviewees are engaged in collaborative activities with Mexico from the UK. From these notions, a series of ideas and policy recommendations arising from the research are addressed in chapter 6.

In sum, this study is constructed from two, complementary (albeit relatively distant) approaches from STS and migration studies to address some of the main contemporary debates on skilled migration and the brain drain from a bottom-up approach. The empirical chapters are informed by these theoretical approaches, under a critical perspective.

The three main topics to organise my empirical findings were chosen due to their explanatory potential, in order to depict a contemporary portrait on skilled migration from a bottom-up approach. In general, *Transnationalism and identity* is focused on the Mexican scientists and engineers' role as individuals, where their migration experience entails reflections, feelings and often changing deliberations. *Professional*

experience is concentrated on addressing what these émigrés think of themselves as "drained brains", what they know, where they work, and some of their potential achievements. And finally, *Collaboration at a distance* addresses the existing/potential contributions of these émigrés from the UK, where a series of policy suggestions are outlined in order to build more bridges with the Mexican skilled diaspora abroad, and consequently, to better understand –and face— the challenges of skilled migration in future years.

Chapter 3

Methodology and Methods

Introduction

The methodology and methods developed from my intention to study the phenomenon of skilled migration from a qualitative approach. In general, studies of the brain drain are mainly quantitative, thus my main interest is to seek a greater understanding on the value and identity of highly-skilled individuals in a contemporary context. More than a focus on 'causes and effects', what drives this study is the understanding of skilled migration as a human experience, with life paths and chronologies (Stake 1995).

For Sismondo, it 'has become almost the norm for constructivist STS to study cases of public interest' (2008, 21), and for Irwin, there is a 'characteristic methodological preference within STS to *follow the actors* rather than make categorical judgments in advance' (2008, 584). My case study combines different data collection methods: a corpus of 36 qualitative, semi-structured interviews with Mexican scientists and engineers in the UK was the main data source for my analysis, followed by four interviews with government officials. Data collection is complemented by the study of previous findings on migration studies, as well as from policy reports, national and international statistics related to skilled migration in Mexico and the UK.

The methodology and methods expressed in this chapter were outlined from a constructivist approach, under three important assumptions: first, skilled migration is observed as a social phenomenon, influenced by relevant factors at the macro-level. Second, this study conceives skilled migration as an active phenomenon, where the construction metaphor refers to the human activity that gives shape to its current (and changing) forms. And third, a constructivist approach was highly relevant to observe how this human activity is related to the construction of scientific and technical

knowledge, including diverse components that span materials, equipment, people, and a complex set of institutions (Sismondo 2008). A degree of flexibility was needed in order to analyse and understand a complex social reality –such as skilled migration—in a comprehensive way. As I was making progress in my research, the scope of some of my initial assumptions was eclipsed by the vast richness of the accounts I was getting, and realised it would be more pertinent not to develop a strict step-by-step planning on my research, nor to have a hypothesis to test either. For Bryman, social reality can often be more surprising than we thought it would be, thus an 'open research strategy' can be more adequate as it enhances the opportunity to access unexpectedly important topics, which may not have been visible by a 'structured, and potentially rigid, study' (Bryman 1988, 67). A balance was achieved by staying rigorous and methodical, as will be described. *[Provide more elements on the constructivist approach and rationale]*

This chapter examines first, the pertinence of a case study for explaining contemporary skilled migration. Then, it addresses the different components of this case study, such as the processes behind the definition of qualitative semi-structured interviews, as well as the steps taken for anonymisation of the data. It moves on to describe the characteristics of the two groups of interviewees –the *Brains* and the *Officials*— and the basis on which they were selected. In the case of the *Brains*, sampling definitions include what is understood by 'highly-skilled' in this thesis, as well as work requirements and the definitions of a minimum length of stay to be considered a "brain-drainer". On the other hand, the *Officials'* names and agencies are described and justified due to their agencies' relationship to skilled migration in Mexico.

From the definitions of the components of the case study and its actors, this chapter moves on to the methodological steps that were taken for rigour and validity purposes, namely, on the coding processes followed and the use of NVivo software under a thematic analysis around transnationalism (or the *Brains* as individuals), professional experience (or the *Brains* as knowledge-carriers) and collaboration at a distance (or the *Brains* as subjects of diaspora-engagement policies). Finally, I describe the complementary perspective of policy analysis that was carried out in selected reports in Mexico and the UK, with the aim of providing a contextual element where

the subjective realities of my interviewees take place, which would not have been revealed only by interviewing. The chapter ends with the scope and limits of this study.

3.1 The pertinence of a case study

As argued in the introductory chapter, the emigration of Mexicans to the UK is certainly not the largest in terms of quantity. Moreover, by comparison to the vast outflows of Mexican skilled émigrés to the U.S., it may not seem relevant enough for politicians or policy-makers to pay close attention. However, by taking a closer look it is possible to observe that the composition of the migratory flow of Mexicans to the UK is valuable in many aspects (such as socioeconomic origins, levels of academic training, the proficiency levels in the use of the English language, expertise, occupations, communities of interest and invisible colleges they belong to, as the empirical evidence on chapters 4 to 6 will show). Moreover, if we take into account how these individuals are immersed in a diverse range of specialised activities, or that their Mexican and professional identity naturally makes them potential contributors to Mexico at a distance, then it is possible to portray a case worth of an in-depth study.

Following Platt's 'rhetorical functions' (1988) for case studies, a case study can *illustrate* the phenomenon of skilled migration by offering a concrete example; *empathy* enables the possibility to grasp the meaning of the lives behind the data; it also helps for *revelation*, or the act of making this group of Mexicans visible –which would otherwise be covered under the vast migration flows towards the U.S.; as a result, it also aims to *persuade* the readers to consider the significance and worthiness of this group; and finally, case studies provide an *aesthetic appeal* by providing a human presentation of what seems to be a multi-factorial phenomena.

However, as with other case studies, I do not aim for generalisation or representativeness. Following Stake (1995), I did not define my sample by the question of *'Which candidates represent the skilled Mexican community in the UK?'* but rather by asking *'Which candidates would be more suitable to understand the experiences of Mexican scientists and engineers in the UK?'* In this part, 'the real business of a case study is particularisation (…) There is emphasis on uniqueness, and that implies knowledge of others that the case is different from, but the first emphasis is on

understanding the case itself' (ibid., 8). In chapters 4 to 6, where the empirical findings are presented, I made an effort not to make general assertions with a quote as a mere confirmatory example, but to compare and contrast the realities of my interviewees with the context where they took place, as Passerini (2012, 32 *in* Baker and Edwards 2012) suggests.

Nevertheless, this study was conceived around the application of its contributions at a broader level. For Platt (1988), case studies have the capacity to suggest that 'an interpretation is plausible, in the particular case, so they might also be so in other cases', whereas Stake (1995) notices their potential as they can contribute for the preciseness of a general reality. By studying the case of the skilled Mexicans in the UK (with the characteristics I discuss in this chapter) my expectations are to shed light on other cases of Mexican highly-skilled migration, and to gain insight into some trends about skilled migration as a whole.

3.1.1 Triangulation

I considered triangulation as a strategy for enhancing the precision and validity of my research. Triangulation has to do with looking for intersection points between different sources, in order to corroborate the events, descriptions and facts reported (Yin 2011, 81) and to provide a more comprehensive view on different aspects that shape skilled migration in Mexico. In this regard, the perceptions of my interviewees within 'migration-facilitating and migration-undermining mechanisms' for skilled migration (chapter 4), their perceptions on the numerous imbalances between Mexico and the UK (chapter 5), and the different challenges for the Mexican diaspora-engagement policy (chapter 6) were compared to previous findings on migration studies, as well as from policy reports, national and international statistics related to skilled migration.

I also carried out what Stake defines as a 'researcher triangulation' (Stake 1995). This process involved presenting the preliminary ideas (and later on, results) to different audiences. I participated once a year in the *Work In Progress Seminars* of my Department in order to refine the scope of this research with my peers (mostly PhD fellow students and my supervisor). The multi-disciplinary focus of STS was very useful

to get different approaches to my research: as a colleague told me, my topic had a great advantage, as almost everyone in the room were actually skilled immigrants –for different temporalities— and had a first-hand opinion on my views. I also sought informal meetings with key specialists on skilled migration to select areas to cover in my research. When I travelled to Mexico, I met some of the most important researchers in the field. Alma Maldonado (Cinvestav) suggested that a problematisation between skilled émigrés in academia and the private sector was underexplored within the brain drain debate in Mexico; Syvie Didou-Aupetit (Cinvestav) emphasised some of the gaps in scholarly debates in Mexico, particularly regarding the Mexican Talent Network; Raúl Delgado Wise (President of the International Migration and Development Network) talked to me about the estimations of Mexican skilled émigrés that his team was conducting for the Conacyt report of 2015 (*see* Delgado Wise et al. 2015); Selene Gaspar, Mónica Chávez and Diego Bunge provided important insights on the estimations of the Mexican skilled émigrés in the UK; and Camelia Tigau and Ana María Aragonés (UNAM) invited me to present my work at a symposium on skilled migration, where a working group (or an invisible college, in my own terms) is in constant communication to study this phenomenon.

Internationally, I presented my work and participated in specialised forums like the Society for Social Studies of Science (4S) Annual Conference in Buenos Aires, where I chaired the conference on scientific mobility with Lucas Luchilo (Centro Redes), and the case of skilled migration in Mexico was addressed from the perspective of shortcomings in Conacyt's scholarship scheme (which will be addressed in chapter 4). I also had the opportunity to meet and share viewpoints with Jean-Baptiste Meyer (a leading researcher on diaspora-engagement policies) in the forum *'Beyond brain drain: skills & mobility without methodological nationalism'*, in Paris. Their views, feedback and critiques influenced the areas explored, as well as the analytical and interpretation processes that are developed in chapters 4 to 6.

3.2 Semi-structured interviews

As Bryman (2012) notes, the interview is probably the most widely employed method

in qualitative research, as there is great interest in the interviewees' point of view. More than outlining a rigid set of questions, the semi-structured interviews were conducted around specific aspects, from which the three main topics (transnationalism and identity, professional experience, and collaboration at a distance) were defined along with the *Brains'* anecdotes and their subsequent analysis. This method allowed me the level of flexibility to listen closely to the responses from my interviewees and to concentrate on those areas where they had more elements to provide, where even a certain degree of "rambling" was important to reveal their particular concerns around the topics set from my research questions (Bryman 1988, 47).

The total time over which I conducted my interviews was one year and three months (slightly longer than expected, for the reasons I specify in the description of each group in sections 3.3 and 3.4), from November 2013, to February 2015. The interview question schedule was tested beforehand, by conducting three pilot-interviews with fellow Mexican graduates in the UK from different fields. This allowed me to gain some experience in conducting the interviews, define the phrasing and order of the questions asked, the most relevant topics to be covered, and to get an idea about their length. The interviews lasted from a range of 45 minutes to 1 hour and 15 minutes (the average length was around 60 minutes) and were recorded in mp3 format. Each interview was carried out in Spanish. Not being a native English speaker –neither myself nor any of my interviewees— represented a challenging, time-consuming endeavour in translating, but I considered the use of Spanish essential to capture as much as I could from my interviewees' thoughts in a way as comprehensively as possible, besides the symbolic component of talking about Mexico in their own native language. Each interview was transcribed using Microsoft Word and facilitated by using Garage Band, a software app that allows for controlling the speed (*tempo*) of the audio tracks. The interviews were then coded and the most important contributions were translated. Only then I felt able to write-up the empirical findings, which include some of the quotes I considered more relevant for illustrating and widening the narrative in more detail. The interview schedule (translated to English) can be found in Appendix II.

3.2.1 Anonymisation and Data Protection

In the case of the *Brains*, all of the information and quotes presented are anonymised through aliases, chosen by the interviewees themselves. Further measures for assuring anonymity were taken from Saunders, Kitzinger and Kitzinger (2014, 2) in terms of maximising protection of participants' identities, and maintaining the value and integrity of data, which was often challenging, particularly because in order to depict the value of their work often required particular details on their occupations, where, as Saunders, Kitzinger and Kitzinger recognise, 'anyone closely tied to a particular research setting will likely be able to recognise participants and places' (ibid., 3). Other recommendations for creating, managing and archiving data were taken from the UK Data Archive[18]. On the other hand, the identity of the four *Officials* (described in section 3.4) is used with their permission, and only for the purposes of this work. Before the start of the interviewing process, this study received the approval of the UCL Science and Technology Studies Department's Ethics Committee, and all of the personal information is protected in accordance with the UK's Data Protection Act. At the start of each interview, I provided my interviewee with a single-page document explaining my research project and the objective of his/her contribution. Each of them signed a Consent Form, which can be found in Appendix III.

In sections (3.3 and 3.4) I introduce my interviewees: the *Brains* and the *Officials*.

3.3 The interviewees, group 1: The *Brains*

The largest part of my research is concentrated on interviews with Mexican scientists and engineers in the UK. The semi-structured approach allowed me to cover as much as I could in the interview question schedule, from which the three main topics to organise my findings were defined along with my interviewees' anecdotes and their subsequent analysis:

i. *Transnationalism and identity:* Birthplace; age; genre; marital status; academic background; ways to leave Mexico/ways to arrive to the UK; life in the UK; years of residence in the UK; views on Mexico/ties at a distance;

[18] http://www.data-archive.ac.uk/ (Accessed December 2015).

travel frequency/reasons to travel to Mexico

ii. *Professional experience:* Career trajectory; professional experience and expertise; occupation in the UK; views/comparisons on professional-related aspects between Mexico and the UK; perceptions on self-fulfilment

iii. *Collaboration at a distance:* Current/past distant collaborative initiatives; feasibility to establish collaborations at a distance with Mexico; views/information on the Mexican Talent Network.

As stated before, the notion of transnationalism was not considered as a main topic at the beginning of my analysis, but a transnational behaviour emerged repeatedly throughout the interviews, where transcriptions allowed me to identify commonalities, differences, and patterns among my interviewees in this topic. The second topic, professional experience, was defined from my interest in investigating the *Brains'* occupations, their comparisons to the professional landscape in Mexico, and levels of satisfaction and self-fulfilment in career-related aspects. The professional experience of the *Brains* in the UK also allowed me to depict a portrait of the imbalances between skilled labour markets of both countries. Finally, the third topic, on collaboration at a distance, was designed from my interest to suggest ways to build bridges between the *Brains* in the UK, and Mexico.

Given the focus of my research, I did not seek participants on a random basis, but rather by a combination of purposive and snowball sampling of forty participants, so that those sampled were relevant to the objectives of the research, but also bearing in mind that the Mexican scientists and engineers are not clearly identified (nor located) by the Mexican Embassy or other agencies, thus participants often suggested others who have similar characteristics (Bryman 2012). Chapter 2 (section 2.1.3) addressed who counted as a *Brain* for the purposes of this study. For this reason, the interviewees were chosen with the following criteria:

- Completed Bachelor's degree (or higher) in the fields of Science, Technology, Engineering and Mathematics (STEM), according to the definitions of the Joint Academic Coding System (JACS), used by the Higher Education Statistics Agency (HESA) and the Universities and Colleges

Admissions Service (UCAS) in the UK (Mellors-Bourne, Connor and Jackson 2011).

- At least two years of living in the UK.
- Working in the UK at the time of the interview.

In total, 40 interviews were conducted, and a total of 36 were used for the present work. The remaining four had to be left out because the interviewees did not meet some of the criteria mentioned above. Even though I opted for a mix between snowball sampling and purposive sampling as the main drivers for this part, an effort was made to obtain a sample that was stratified in terms of gender, age (and experience), years of living in the UK, place of residence in the UK, and sector (academic and private) in order to provide as balanced a picture as possible. With this in mind, the *Brains* were interviewed either at their work places or cafes in different places in the UK: Crawley, Birmingham, Brighton, Coventry, Durham, Manchester, Oxford and several locations in London. Even though these interviews required commuting and other costs, I sought to conduct all the interviews face-to-face, as part of a pursuit to *humanise* the statistics and to be able to reach what Polsky remarks as 'successful field research', which depends on 'the investigator's trained abilities to look at people, listen to them, think and feel with them, talk *with* them rather than *at* them…' (Polsky 1998, *in* Baker and Edwards 2012, 14).

In order to address the relevance of the experience of the Mexican skilled émigrés in the UK, I compared and contrasted the anecdotes of interviewees from academia with the private sector, in order to show a more comprehensive picture of the professional pathways of Mexican scientists and engineers in the UK. Despite working in different sectors (conducting research and non-research activities), the similarities in their views, experiences, expectations and challenges were noteworthy, both in personal and professional aspects, as will be shown in chapters 4 to 6.

In some cases, some unplanned (but certainly appealing) activities accompanied the interviews, like visits to the labs of my interviewees, meeting some members of their staff (in the case of senior scientists), and informal talks about other unrelated topics (like football or politics). Being a Mexican myself (and a temporary immigrant during

the course of my doctoral programme) contributed positively for engagement purposes. Many times the *Brains* would even volunteer to pay for coffee: I heard more than once, *'I may be the interviewee, but you are still the unpaid student'*. I kept in mind those experiences to situate my focus on the relevance of learning more about these "other" Mexican émigrés of whom we know very little to date, and moreover, on their value as individuals. Full details of my informants (alias, gender, age, years of living in the UK, and work sector) can be found in Appendix I.

3.3.1 Sampling definitions: Why 36 interviews?

A total of 40 interviews were conducted on the basis of meeting both methodological and practical requirements (from which 36 met my criteria, as stated before). This meant the challenge of outlining a comprehensive set of topics to be addressed with the time and resources I had available.

In social research, the debate about *'How many interviews is enough?'* is commonplace (*see* Baker and Edwards 2012). In this regard, Becker (2012, 15, *in* Baker and Edwards 2012) suggests that it would only take a few interviews to demonstrate that a phenomenon is more complex than previously thought, but I considered it essential to keep gathering data until a solid level of saturation was reached. Following Glaser and Strauss's (1967, *in* Baker and Edwards 2012, 18) description, saturation is a process in which the researcher continues to sample relevant cases until no new insights emerge from the data, or as Ragin (2012, 34, *in* Baker and Edwards 2012) noted, when the evidence is so repetitive that there is no need to add more cases. This was not a linear process, but a continuous back-and-forth from the sampling, data analysis and data collection processes.

Along with the methodological definitions, there were also relevant practical issues taken into account. As noted in section 3.3, snowball sampling was needed since little is known about the number of highly-skilled Mexicans abroad, their identity or their location. I experienced this situation first-hand: It took me several weeks to locate my candidates because the Mexican Embassy had very limited information on them. I was then referred to the Mexican Talent Network in the UK, where I met its President Cynthia Vega, who helped me start contacting them. After more than 30 emails were

sent, several replies were obtained and interviews were finally scheduled.

3.3.2 Why a minimum of two years in the UK?

As we observed in chapters 1 and 2, transnationalism entails a dynamic mobility process, and thus it is equally relevant to establish a clear distinction between the concepts of *mobility* and *migration* used for this study. Laudel (2005) addresses this aspect as a common 'limitation' of migration studies: while scientific mobility may be a normal path of scientific careers (specially among elites), there is a clear difference when the actual decision of scientists to remain abroad takes place, and in such cases, 'mobility becomes migration'. To clarify this distinction Laudel employs the definition of migration by Crawford, Shinn and Sörlin (1993, *in* Laudel 2005, 381), as 'the physical movement of people across national boundaries for extended periods of times', where migration involves a minimum absence of two years away from the home country. In order to identify commonalities on life and work experiences among the Mexican scientists and engineers in the UK, my purposive sampling followed this two-year period of being abroad as the minimum time for selecting my interviewees.

Likewise, it was important to clarify the process of migration, so that my interviewees were proper Mexican 'knowledge nomads' (Day and Stilgoe 2009). In this regard, Laudel (ibid.) claims that a distinction between *family migration* and *scientific migration* should also be clearly established. Indeed, many young students leave their country with their parents, enrol in a foreign university and start working thereafter. This is not skilled migration, but a family migration, and therefore there is no 'brain drain'. This is why my work included only those candidates who obtained at least their undergraduate degree in Mexico. In his quantitative analysis, Laudel also states that 'it seems wise to abandon pre-conceived notions about broad reasons for migration, and to explore specific work-related and personal motivations' (ibid., 383), but through the lens of a qualitative study, such a boundary is not always clear, as will be argued in chapter 4.

3.4 The interviewees, group 2: *The Officials*

Four additional interviews were conducted with three government officials whose

work is related to some extent with the issue of skilled migration, as well as with the President of the Mexican Talent Network (MTN) in the UK. Even though she does not work for the Mexican government, her role as the spokeswoman of the MTN suited her better to this group. The specific interest of this part of my research is to investigate how the *Officials* conceptualise skilled migration, identify their level of involvement in the policies towards skilled migration, and to contrast their views with the perceptions of the *Brains*.

3.4.1 Who are they?

By contrast to the anonymous condition of the 36 *Brains*, the identity of the *Officials* is fully described, as the focus of interest relied on the interview as much as on the interviewee, that is, on his/her thoughts and also on the level of his/her authority. Before the interview however, it was established that the views expressed should not be acknowledged as "official claims", nor as "government's plans" either.

Interviewees:

1. Enrique Cabrero – Director General of the Mexican Science and Technology Council (Conacyt)
2. Dolores Sánchez – Deputy Director of Postgraduate Studies and Scholarships (Conacyt)
3. Francisco de la Torre – Executive Director of the Institute for Mexicans Abroad (IME)
4. Cynthia Vega – President of the Mexican Talent Network, UK branch (MTN-UK)

This set of interviews was particularly challenging to arrange, as the *Officials'* agendas are busy, and in the first three cases they were conducted in Mexico City, which required me to articulate their agendas with my brief periods of stay in Mexico. However, given the limitations of time and resources (and in some cases, long waiting periods to be granted an interview) I consider that sufficient information was obtained to assess how these representatives conceive skilled migration, and their views on the programmes of diaspora-engagement allowed an assessment of the challenges ahead for Mexico in the subject. Having limited time, the questions raised had to be

narrowed-down to concentrate on those issues where they could provide more important details around my research questions. The interview question schedule was therefore adapted for each case, but revolved around the following topics:

FIGURE 5.

THE OFFICIALS:

TOPICS COVERED IN INTERVIEW SCHEDULE

	Enrique Cabrero (Conacyt)	Dolores Sánchez (Conacyt)	Cynthia Vega (MTN)	Francisco de la Torre (IME)
Date of appointment	X	X	X	X
Main duties/responsibilities	X	X	X	X
Views on skilled migration	X	X	X	X
Repatriation/ talent attraction policies	X	X		X
Specific projects on diaspora-engagement	X		X	X
Estimations/statistics on the Mexican diaspora in the world (mainly U.S. and the UK)	X			X
Details on the Mexican scholarship programme	X	X		

3.4.2 Why them?

The *Officials* were contacted on the basis of the agencies that deal with issues related to skilled migration: the Mexican Science and Technology Council (Conacyt), the Institute for Mexicans Abroad (IME) and the Mexican Talent Network (MTN).

On the one hand, Conacyt is the main sponsor for the highly-skilled training in a wide range of disciplines (mainly science and technology) and it also has a mandate to manage the largest proportion of the budget on science and technology. Conacyt also plays an essential role in the definition of the Mexican science policy: It is the institution primarily responsible for the outline of the Special Programme for Science, Technology and Innovation (PECITI) for each Presidential Administration, and it is also in charge of the definition of the "priority areas of research", which defines which fields will get priority government support in terms of scholarships, equipment, training, and so on. On the other hand, the IME was created in 2003 as an agency specifically focused on establishing links with the country's diaspora. As we will see in chapter 6, its main focus is naturally concentrated in the Mexican community in the U.S., where the vast majority is unskilled. However, in 2005 the IME set up the

Mexican Talent Network (MTN) with the collaboration of Mexican émigrés in Silicon Valley, in order to establish contact with the skilled Mexican diaspora. The UK branch (known as "chapter") was created five years later, in 2010. As the Mexican diaspora-engagement policy, the President of the MTN-UK was contacted in order to grasp the particularities of the network, its challenges, possibilities, and shortcomings.

3.5 Qualitative data analysis

For this study, coding was an essential process for identifying commonalities, differences, patterns, transitions, significance, and potential missing data in the migration experience of my interviewees (Seidel and Kelle 1995; Hatch 2002), in order to notice relevant phenomena, collect examples, and later on to define the main themes in which my research is based. During the coding process, I followed Saldaña's (2009) relatively simple but useful advice: to ask myself *"What strikes me?"* throughout my data. As he mentions, 'coding is not precise science; it is primarily an interpretative act' and a 'transitional process between data collection and data analysis' (ibid., 4).

All of the interviews conducted (with *Brains* and *Officials*) followed three coding cycles, and followed the steps and considerations suggested by Bryman (2012): 'code as soon as possible… read through your initial set of transcripts and field notes… and remember that any one item or slice of data can and often should be coded in more than one way'. The first cycle, or "pre-coding" (following Layder 1998, *in* Saldaña 2009) was done at the same time as the interview developed, and consisted of taking quick notes on the topics that I thought were more relevant for each of my interviewees. Whenever my interviewees addressed a topic with particular interest/detail/feeling, I would encourage him/her to continue sharing more details that could reveal more valuable information for the study. The second coding cycle took place along with the transcription process. All of the interviews were printed and coded on paper, in order to know with a greater level of detail *who said what*, the particularities about each case, and to observe what initial relations and patterns could be identified. Three different colours where used to highlight how such patterns could relate to either life stories (which would later on be identified as transnationalism and identity),

anecdotes about their professional experience, and issues on collaboration at a distance. The last coding cycle involved the use of NVivo, a Computer Assisted Qualitative Data Analysis Software (CAQDAS). By using NVivo, a list of codes was set from the two previous processes, and was later re-defined and re-grouped according to the hierarchies I progressively established between the nodes (a collection of references about themes, experiences, or people). The software's possibilities, such as node organisation, coloured-coding stripes or the ability to arrange case classifications allowed me to make cross-references, observe the frequency of specific topics, identify contrasts and commonalities, and run several queries.

Altogether, transcription, coding and re-coding constituted one of the most time-consuming parts of the thesis. However, and as Bryman (2012) observed, albeit its importance for thinking about the meaning of the data, coding is only part of the process, as I still needed to interpret these findings, and organise them according to my research questions and topics of interest. I also considered the criticisms of the coding approach, such as being careful not to lose the context of what was said, or to fragment the narrative of my interviewees' anecdotes. This is why some of the quotes are particularly long in view of their relevance to my research questions.

Because of their different nature, I split the *Brains* and the *Officials* into separate files, in order to analyse them without "polluting" one with the other. I went back-and-forth between my early interests, research questions, and the coding processes, until I reached a set of categories that encompassed my data from both the *Brains* and the *Officials,* where the three main topics I use for this study (transnationalism and identity, professional experience, and collaboration at a distance) were relatively clear in view of their relevance for developing my case study. The codes enabled me to establish links and commonalities, but not only frequency or difference guided my coding process, but also in view of their significance, as Hatch (2002) suggests. For instance, language was not mentioned constantly, but it gave me the idea that it would definitively be essential as a barrier/enabler mechanism for skilled migration, as it would also provide clues for explaining the mobility of my interviewees. After reaching this stage of the process, I relied mainly on a thematic analysis, a technique that despite not having an identifiable heritage (Bryman 2012), it is useful for adding clarity

to the methods I followed under a constructivist approach, to organise, analyse and report my findings. Thematic analysis, as explained by Braun and Clarke (2006), will also allow other researchers to evaluate this study, compare it and contrast it with similar research in the field.

A coding example around the three topics covered can be found in Appendix IV.

3.6 Documents and archives

As has been argued, the narrative of the *Brains* and the *Officials* cannot be understood as isolated from a broader political reality (i.e. Transmigrants still need visas; imbalances in scientific/professional endeavours rely on articulated policy strategies; and calls for action, such as long-distance collaborative initiatives also require a policy approach). My work is hence complemented by sources like government publications (Mexican and British), international organisations' reports, policy literature and other related data with two, articulated intentions: firstly, to provide a contextual element where the subjective realities of my interviewees take place. These elements can be particularly noticeable in chapter 4, when I address what the *Brains'* lives are like in the UK by comparison to Mexico, and in chapter 5, when I discuss the imbalances between the scientific/professional labour markets between both countries. In both cases, the anecdotes were also contrasted with data from official reports, statistics, policies and other documents that could provide more contextual facts. Secondly, these documents were used to support the policy analysis of the Mexican Talent Network in chapter 6, namely, on how long-distance collaborative initiatives are arranged by the *Brains* from the UK, what elements can support further alternatives, and to discuss whether the government is tackling such collaborations through the MTN or not, and why.

With regard to the Mexican policies, the focus is placed on the MTN, as the main diaspora-engagement policy from the Mexican government. Triangulation was employed to outline a narrative between the views from the *Brains*, the *Officials,* and the contents of different policy documents from the current Presidential Administration (2012-2018) in Mexico, such as the National Development Plan (Government of Mexico 2013) and the Special Programme for Science, Technology and

Innovation 2014-2018 (Conacyt 2014).

Notwithstanding, the tensions and imbalances of skilled migration cannot be grasped without an effort to understand *what is happening in the UK*, on the other side of the Atlantic. The UK's policies and statements from the Coalition government (2010 to 2015) were used to identify the government strategies around talent attraction and talent retention. To this end, the documents selected were 'Our Plan to Growth: Science and Innovation' outlined by the Coalition government in December 2014 (BIS-HM Treasury 2014); and 'Fixing the foundations: Creating a more prosperous nation', published in July 2015 (BIS-HM Treasury 2015). In selecting the documents, I was partly assisted by the comments of a science policy expert in the UK, who kindly suggested his views but requested anonymity. The views expressed in these documents were complemented by the analysis of Cerna (2016) in regard of highly-skilled immigration policies in the UK.

Finally, the Dual Year Mexico in the UK/The UK in Mexico, carried out in 2015 as a diplomatic negotiation, was also addressed to identify the agreements amongst the two nations that could be related to skilled migration (particularly scholarships and knowledge transfer initiatives) and more broadly, to discuss how this bi-lateral collaboration could be related to the notion of scientific diplomacy. All of the documents were consulted or downloaded from official sources.

3.7 Scope and limits

3.7.1 Subjectivity and relativity

As with all research, my work has limits to be considered. Perhaps the main one has to do with the embedded element of subjectivity in qualitative research. Being a Mexican skilled migrant in the UK myself (albeit temporary) I was able to experience first-hand the process of leaving my country behind in pursuit of personal and professional experiences, with a sense of adventure. Having the opportunity of both working and studying in an academic environment for the last four years, I had the access that allowed me to engage in many conversations related to my topic of research. Altogether this influenced my research in a decisive way. For Passerini, when narrating any qualitative testimony, we should always make explicit the effects of subjectivity in

the encounter between two or more persons: 'certain questions were asked, and not the other ones; certain replies were given, and in other points there was silence…' (Passerini 2012, 32 *in* Baker and Edwards 2012, 31).

Secondly, there is the issue of relativity. As Stake notices, there is always a principle of relativity embedded in a qualitative case study: 'each researcher contributes in a singular way to the construction of a case study; each reader will deduce a singular significance' (Stake 1995, 92). It was my decision to know up to which point I would get involved as an observer of my case study, or what should be the relevance given to each of its components; it was my decision on how to analyse the data; and I decided how to tell the story about it. In this regard, I coincide with Guba and Lincoln's (1989) stance on qualitative considerations to bear in mind, when they point out that assuming that a human investigator can step outside his own humanness, disregarding one's own values, 'is to believe in magic' (ibid., 47). Acknowledging this, however, made me more prone to find counter-narratives, unsuspected findings and ideas, and gaps.

3.7.2 Truthfulness and off the record statements

It should also be acknowledged that there is no way to tell how truthful the views offered by my interviewees *really* are. Following Wolcott (2009, 28), 'What people say can be relayed exactly as they said it. That does not necessarily make it true, but the words themselves can be transcribed and reported as stated'. Even though I paid close attention to the subtleties on my interviewees' answers (like body language and emotional expressions) I was careful not to involve inferences in my findings, in reference to what Wolcott (ibid.) understands as 'observed and inferred behaviour'. Notwithstanding, it is important to notice that the identity and qualifications of each of my interviewees was confirmed by trustworthy sources (official websites, institutions, publications, and so on).

I also took Miller's views into consideration: 'Don't ever just rely on the interview or on the language, and don't believe that an interview tells you what people actually do' (Miller 2012, *in* Baker and Edwards 2012, 31). In addition to the issue of truthfulness, there were off the record statements in the interviews; particularly one of them

caught my attention. When asked about his thoughts on his work, one of my interviewees told me *on the record* that his job in the UK was deeply satisfying and listed his reasons, but later on –once the interview finished and we were talking informally— he told me *off the record* that he did not enjoy his job and was actually looking for other options. I find this matter, albeit important to recognise, also unavoidable when conducting qualitative analysis.

3.8 Time period

The time period of analysis that this thesis covers ranges from 2005, when the MTN programme was created, to 2015, when the last semi-structured interview was conducted. Given the rapid changes to skilled migration as a societal process, it is important to bear this time lapse in mind, given that important events, like the Brexit in the UK and the Presidential Elections in the U.S., are beyond the scope of analysis of this thesis. In the conclusions (chapter 7), I suggest that these events are indeed important topics for future research.

Conclusions

The description of the methodology and methods provides details on how this work was conceived and conducted, where common challenges in qualitative studies are to follow 'open research strategies' (Bryman 1988) with rigorous methods to enhance the validity of research findings.

The core of this study relies on semi-structured interviews. As studies of skilled migration and the brain drain are primarily quantitative, my view was to approach to the phenomenon from the perspective of the migrant, to conceive their mobility as a human experience, influenced by numerous factors at the macro-level, and not the opposite. The chosen method to identify how skilled migration unfolds within these life paths and chronologies, as noted by Stake (1995), was through semi-structured interviews, where key topics (such as transnationalism in chapter 4, the notion of imbalances in chapter 5, and most of the policy suggestions in chapter 6) were defined along with the *Brains'* and the *Officials'* anecdotes, viewpoints, and their subsequent

analysis. As has been argued, even a certain degree of 'rambling' (Bryman, ibid.) allowed for a more detailed construction of my interviewees' experience.

Carrying out interviews was an intense experience between travels to Mexico City and several locations within the UK. As one of my main interests is to advocate for the visibility of these other migrant communities of Mexicans, Skype interviews were avoided. I wanted to meet these skilled émigrés in person, and whenever possible, to know the places where they work. Interviews were carried out in Spanish as part of a symbolism (a shared native language that joined us), but more importantly, to get a closer perception of relevant issues for this research, like identity and belonging, which will be addressed in chapter 4.

As stated in chapter 2, bringing together two theoretical approaches –STS and migration studies— was not simple. However, the criteria for selecting the *Brains* –my main group of interviewees— were essential for articulating a more coherent narrative. This study is about a particular group within skilled migration: scientists and engineers from STEM fields, with undergraduate diplomas from Mexico, and working and living in the UK. These requirements allowed me to define my own stance of *who is* 'highly-skilled' for the purposes of this study. Likewise, defining a minimum length to stay in the UK (of two years), allowed me to establish a stance within transnationalism, given that its flexibility enables a more realistic view on many aspects of the migrant experience (and on the role of the state), but it also requires a level of delimitation between mobility and migration.

On the other hand, the *Officials* were selected on the basis of their authority, as well as their responsibilities within the agencies where they work. For this reason, their full names were essential, as their anecdotes and viewpoints allowed an observation of contrasts and similarities with the perspective of the *Brains*. Despite the modest number of interviews conducted, their views were also key to informing about the role of the Mexican government behind skilled migration in chapter 6, as their agencies are closely related to skilled migration in Mexico. As was explained, Conacyt is the main government agency for science policy and training human capital; the IME is the most

important foreign affairs office in charge of diaspora-engagement; and the MTN is the main programme for establishing links with the highly-skilled diaspora.

A permanent concern for improving the validity of my empirical findings relied on determining a sufficient number of interviews, given time and resources available. An important element relied on saturation, or the moment when I started to hear similar insights from my interviewees, as Glaser and Strauss (1967, *in* Baker and Edwards 2012) suggested. Another was triangulation, in order to corroborate the events, widening the descriptions, and providing more details to the narrative of my interviewees. A 'researcher triangulation', as Stake (1995) suggests, was also highly relevant for defining the scope of this research, as well as for identifying key topics and potential gaps within scholarly debates of skilled migration. Following these initial determinations, the interpretation and analysis of my results were fundamental challenges. Coding was an essential process for identifying commonalities, patterns, transitions, and other significant elements on the experience of my interviewees (Seidel and Kelle 1995; Hatch 2002). Additional challenges were found when translating particular Mexican-Spanish slang, phrases and sayings into English. The three coding processes followed (during the interview, during the transcription and translation into English, and particularly with the use of NVivo) allowed me to observe how this data was connected to my research questions and main interests. Notwithstanding, moving forward in these processes did not imply leaving aside the previous one, and during the writing phase I frequently re-read the printed transcripts, listened to the recordings, and used NVivo simultaneously.

The complementary perspective relied on the analysis and review of official reports, policy literature, government publications, statistics and other relevant data, in order to provide the narrative of the *Brains* and *Officials* with a contextual element to support the subjective realities of my interviewees, from which a political scenario between the UK and Mexico can be constructed within these countries' interests.

Altogether, I made efforts to achieve a 'good interpretation' of my findings, following Yin (2011, 207): *completeness* (I sought to draw on a beginning story, a middle story and ending remarks); *fairness* (which relies on having a clear interpretative stance in

the methodology and methods followed, described in this chapter, in which others following the same stance would arrive to similar interpretations); *empirical accuracy* (an objective-as-possible representation of my data); *added-value* (an original view on skilled migration, based on the case study of the Mexican scientists and engineers in the UK); and *credibility* (a transparent, and flexible yet rigorous method that can be acceptable for other colleagues and experts in the field).

I share the views of many qualitative researchers in the sense that knowledge is constructed, rather than discovered (Platt 1988; Stake 1995; Stilgoe 2004). This is a construction from the interviews, the views from the officials, the information from policies, reports and statistics, and a review of the literature of STS and migration studies. My interest to address skilled migration and the brain drain was shared by the *Brains* and the *Officials* themselves, who agreed to be interviewed as they also considered this as a relevant issue to address, to understand more broadly, and perhaps more importantly, they also shared my view on the need to call for action. The following empirical chapters build on from these views.

Chapter 4

Neither from here nor from there:

Transnationalism, identity and belonging

Introduction

This chapter explores the migrant experience through the lens of transnationalism. The present story was guided by the methods described in chapter 3, but during the different processes taken to analyse the *Brains'* anecdotes, transnationalism appeared as a pertinent framework within which to organise my empirical evidence. The focus is thus placed on skilled migration from the perspective of individual life paths, presented in a chronological way. The main objective of this chapter is to show what patterns, differences, motivations and transitions within these life paths are the most relevant in my interviewees' decisions to leave the country, and later on, to remain in the UK. To achieve this objective, the chapter is divided in five parts, each one is introduced with a brief quote, taken from the semi-structured interviews, where I followed Saldaña's (2009) advice on asking myself *What strikes me?* during the coding processes (see chapter 3, section 3.5).

Part one introduces the *Brains*, the main actors of this study, through the nicknames chosen by themselves, as well as personal details (age group, genre, number of years abroad). A brief introduction to their academic qualifications and their work sector (simplified in two broad categories, academia and private) are also introduced in view of their relationship to early migration experiences. From these initial observations, a portrayal of skilled émigrés as privileged socioeconomic groups can be observed.

Part two addresses the ways in which the *Brains* leave Mexico, where postgraduate studies play a fundamental role. The main factors at micro and macro-levels allow an observation of the decisions to leave not from one, but from many rationalities, as noted by Harzig, Hoerder and Gabaccia (2009) in chapter 2 (section 2.2.1). Moreover,

relevant notions from STS, such as the deliberations between scientific vocation and a moral equivalence, are observed through the lens of empirical evidence. Likewise, this part describes initial processes by which skilled émigrés progressively become members of invisible colleges and communities of interest in Mexico and the UK.

Part three analyses key components within the transnational perspective, regarding how mobility becomes an alternative to migration. The decisions and motivations to remain in the UK are developed from a notion of continuity, where key personal and professional aspects within the migrant experience (namely work opportunities and love) constitute relevant "anchoring" factors behind the decisions to remain —I suggest this term by contrast to the traditional connotations of "push" and "pull" factors in migration studies.

Part four explores what the life of the *Brains* is like in the UK. Again, the narrative and traditional assumptions within the narrative of the drain narrative (described in chapter 2), where migrating as a way to achieve a "better" life are revisited through the émigrés' perceptions and comparisons between Mexico and the UK, regarding living conditions, facilities to socialise, living standards and, importantly, the role of family and long-time friendships. In this part, reflexivity processes and deliberations between past and actual life appear as elements of transnational behaviour.

Finally, *Part five* addresses the notions of identity and belonging through time and distance. Different elements regarding the *Brains' Mexicanhood* from the UK coexist with a sense of alienation and attachment to their roots, and are indeed elements between these 'negotiations' of identity. This part also addresses their thoughts and feelings about Mexico at a distance, as well as the constant efforts made to travel with a certain frequency to the country.

This chapter is mainly focused on the lived human aspect of skilled migration. Informed by the perspectives of STS and migration studies, it is essential for this study to know what the experience of Mexican scientists and engineers in the UK has been, and from these understandings, to grasp the relevance of their experience for the contemporary debate on skilled migration in Mexico.

– Part one –

WHO ARE THEY?

4.1 Introducing the *Brains*

The 36 Mexican scientists and engineers informing this study are a diverse group, stratified in age, gender, qualifications, and number of years abroad (Figure 6). More than one-third is young (31-35 years old), but also some ageing 51 and over were interviewed. As for gender, the vast majority are men (27 versus only 9 women), and most of them are originally from Mexico's capital city (in 20 cases). Furthermore, if we divide Mexico by regions (North, Central, South, East and West), it is possible to observe that 24 of my interviewees come from the Central area of Mexico (besides Mexico City, the states of Puebla and the State of Mexico); 7 from the Northern area (Aguascalientes, Baja California, Chihuahua, Guanajuato, Sinaloa and Sonora); 2 from the West (Jalisco); 2 from the South (Chiapas and Yucatán); and only one in the East (Veracruz).

FIGURE 6.

SAMPLE'S DETAILS[19]

Age group	Genre	Years abroad	Qualifications (max level of studies)	Work sector
31-35: 13 36-40: 8 41-45: 9 46-50: 3 51+: 3	Male: 27 Female: 9	2-5: 6 6-10: 11 11-15: 13 16+: 6	PhDs: 26 MAs: 8 BSc: 2	Academia: 19 Private: 15 Both: 2

These émigrés vary in the number of years they left the country, from 2 years to more than 16, and currently live in different locations across the UK: Crawley, Birmingham, Brighton, Coventry, Durham, Manchester, Oxford, and the vast majority in London.

4.1.1 Work sector

Despite their diversity, this study develops from two relevant features that these Mexicans share: they are all highly-skilled, and they all work in the UK. As we could observe in Figure 6, my sample includes 26 Mexicans with doctorate degrees; 8 with Master's, and 2 with Bachelor's degrees. They have managed to enter the labour

[19] See Appendix I for full details on the *Brains*.

market in the UK, and are employed at British universities, research centres, private corporations of different size (from start-ups to transnational), or are self-employed at their own companies or as free-lancers: overall, 19 of them work in academia, 15 in the private sector, and 2 carry out activities in both sectors.

As noted in Chapter 3, the *Brains* themselves chose their nicknames. I introduce them in this part and will refer to them constantly onwards. Firstly, the *Brains* who work in academia, in different positions of the British career curriculum:

FIGURE 7.

THE *BRAINS* IN ACADEMIA

Research Associate	7	*Starignus (F), Erasmus (F), Paco (M), Quiquillo (M), Cris (F), Pinky (F), DJC (M)*
Research Fellow	3	*Rafa (M), Beto (M), AGG (F)*
Lecturer	4	*Mango (M)*, Raúl (M)*, Salvador (M), Étienne (M)*
Senior Lecturer	3	*Tzotzil (M), UKMEX (M), Víctor (M)*
Professor	4	*Puma (M), Alejandro (M), T (F), AR (M)*

(M) Male (F) Female

* *Mango* and *Raúl* declared that they carry out activities in both sectors

Secondly, the *Brains* who work in the private sector, whose occupations are harder to group together, and their work is also more diverse, as they conduct research-related and non research-related activities:

FIGURE 8.

THE *BRAINS* IN THE PRIVATE SECTOR

Software Engineer in Test – *Juan (M)*	Solution Consultant – *Rius (M)*
Senior Engineer – *Thelonious (M)*	Management Consultant – *Gabriel (M)*
Project Manager – *Emilio (M)*	Risk Manager – *A (F)*
Freelance in Statistics – *Lola (F)*	Research Engineer – *Charantulo (M)*
Data Scientist – *Chinos (M)*	Android Developer – *Javier (M)*
Lean Consultant – *Mariana (F)*	Brand Manager – *Max (M)*
Owns his own company – *Mango* (M), Antonio (M)*	Business Development Manager – *Raúl (M)**
Technical Director – *JuanR (M)*	Vehicle Dynamics Engineer – *Juan Pablo (M)*

(M) Male (F) Female

* *Mango* and *Raúl* declared that they carry out activities in both sectors

From this sample, I will address relevant features of their migrant experience in the UK from the perspective of transnationalism: their life chronologies, early mobility

experiences, their decisions to leave Mexico, their lives in the UK, and their ties with Mexico from a distance. In this narrative, an elite component was identified in my sample, which is essential to explain their pathways to the UK.

4.1.2 A privileged socioeconomic background

In her work on the migration of skilled individuals in Mexico, Castaños-Lomnitz (2004) emphasised that the brain drain in Mexico refers, in a vast majority of cases, to the professional elites of middle classes. Likewise, in her case study on Mexican expatriates in the U.S., Europe, Japan and Canada, Tigau (2013) did not find individuals from poverty backgrounds, and she concluded that these professionals were part of the 'elites of globalisation' (ibid., 14).

In my case study, a privileged socioeconomic background is also found, given that these émigrés: i. Had access to tertiary education in Mexico and hold an undergraduate diploma; ii. Speak English as a second language; iii. Had access to information on scholarships, postgraduate programmes and/or work opportunities abroad; iv. Counted on additional resources (savings, wages, or parental support) to afford the living expenses in the UK; v. Were able to cross the Atlantic Ocean and arrive in the UK, more than 5,500 miles away from Mexico; and vi. Had access/the opportunity to develop networks to leave Mexico/remain in the UK.

However, differences were found in this privileged status. A first group is comprised of those *Brains* who had the means to cover the expenses of a postgraduate programme abroad (tuition fees and maintenance). A second group were those *Brains* who would not have been able to leave Mexico had they not had a scholarship to cover their tuition fees or their maintenance in the UK. Within this difference, the choice of a university in Mexico (private or public) appears as a relevant element that influences both postgraduate studies (López Ramírez 2015) and work sector decisions afterwards, where an element of elitism is revealed, as will be addressed in the next section.

4.1.3 Between privileges and elitism: The decision to enrol in private or public universities in Mexico

For Davey (2012) and Greenbank (2009), the educational transition from basic to higher education is embedded in social inequalities. This is noteworthy in Mexico, as figures by the Ministry of Public Education in Mexico show that, on average, from every 100 Mexicans who enrol in Primary School (Mexican basic education), only 17 succeed in progressing through the education levels to get an undergraduate diploma (Hernández Bringas et.al. 2012, 137).

But even within higher education, choosing a university marks a difference among my interviewees in their subsequent choice of work sector (academia or industry). Following Davey (2012), this is associated with the social origin of the student, which manifests in three different levels: i. The perception about a particular higher education Institution and whether or not they are able to pay tuition fees; ii. The social capital of the student, which, as noted in chapter 2 (section 2.2.4), involves the networks of their relatives, access to information and guidance from relatives or teachers; and iii. The influence they receive from the previous schools where they studied (which gives shape to expectations, networks, and decisions).

From this perspective, social origin (perceptions, social capital and influence) plays a distinctive role in the choices made by the *Brains*, where two main trends can be noted: for those who were interested in carrying out research-oriented activities, the decision to enrol in public universities was preferred for studying an undergraduate programme (in 16 cases), whereas the *Brains* who work in the private sector primarily attended private universities for their undergraduate degree (in 13 cases):

FIGURE 9.

PUBLIC/PRIVATE UNIVERSITY IN MEXICO (UNDEGRADUATE DEGREE)

AND CURRENT WORK SECTOR OF THE *BRAINS*

Public university	→	Academia: 16
Public university	→	Private sector: 2
Private university	→	Academia: 3
Private university	→	Private sector: 13
Private university	→	Academia and private sector [mixed activities]: 2

In the case of the *Brains* who currently work in academia, the vast majority (more than half) enrolled at different public universities, mainly the National Autonomous University of Mexico (UNAM) followed by the National Polytechnic Institute (IPN), and the Centre for Research and Advanced Studies of the IPN (Cinvestav) for their undergraduate degree. However, more than a decision based on the cost of the tuition fees, the most recurrent reason to enrol in public universities among my interviewees is summarised by *Juan*: *'In private universities in Mexico there is not much interest in research'.*

As the leading public academic institution in Mexico, UNAM has traditionally been the preferred choice among students for conducting scientific research. *Paco* recalls how UNAM allowed him to identify his research interests during his undergraduate degree, in Electronics Electric Engineering:

> I always had an interest in science and technology, and when I was studying my degree at UNAM I discovered that I was really interested in many research aspects, so I got involved in research projects early at the Institute of Engineering. I was fellow of the institute and I did my Bachelor's and Master's thesis there. I always thought it important to really devote myself to the most important part for me, which was Design. I have always been a consumer of technology and I thought that the next step for me was to know how the gadgets I used were designed.

As *Paco* shows, his early interests were focused on the design of gadgets and research in technology, which guided his preference for a public university. These two aspects– design and research— would later guide him to a postgraduate doctorate degree in the UK. By contrast to the *Brains* in academia, the notion of social origins were more visible on those *Brains* who aimed to work in the private sector, as they emphasised more regularly that a private university would allow them to "fit in" with their peers. In Mexico, private universities are well known for their tendency to concentrate socioeconomic elites who can afford costly tuition fees, and are also perceived as valuable means for making connections and getting hired by important corporations. The reason is related to an elitist component that is referred to by *Gabriel,* an engineer working as a Management Consultant in a firm in the UK. He attended the TEC of Monterrey (a renown technological private higher education institution) to study his undergraduate degree:

> If I look at the profiles of my colleagues in Mexico, everyone will be TEC, Ibero, or Anáhuac graduates [three top Mexican private universities], they will all have flashy last names, they will come from families that are already linked to the business environment, or politics. That makes it a drastically different environment than in the UK. Here there is some level of selectivity, but in general any middle-class, hard-working and intelligent person can aspire for a job. In Mexico, to my firm, an intelligent, middle-class person would simply not be enough. I don't see public school graduates from the UNAM or IPN in the ranks of my company. Moreover, my company had a policy of recruiting only TEC of Monterrey graduates.

Gabriel emphasises the association between private universities and the concentration of socioeconomic elites in the private sector of Mexico, where a sharp contrast is observed between the professional environments in Mexico and the UK, regarding meritocracy as an important underlying working condition that is appreciated by a good number of my interviewees (and will be further analysed in Chapter 5, section 5.3.6). *Chinos* on the other hand, is a Data Scientist working in the private sector in the UK, and illustrates how the decisions to enrol in a public or private university are influenced by expectations about where to work afterwards:

> I knew I didn't want to stay in academia. It was very clear that I wanted to return to the private sector. I was very interested in Machine Learning, Artificial Intelligence and several other concepts that are not easy to study at an undergraduate or a Master's level, so I looked where I could learn about these things. Besides, I didn't want to study those topics in Mexico, because although there are programmes at IPN or UNAM (...) if you want to work in the private sector, like me, those programmes unfortunately won't open the doors for you; not like getting a degree abroad.

These contrasting viewpoints show different deliberation processes among my interviewees, who reflect between public and private universities in terms of their career interests and subsequent choice of work sector, often influenced by a prevailing notion of elitism, particularly in the private sector. Despite these differences, these groups resemble each other in their pursuit of opportunities abroad. We will observe how these decisions are shaped in the next section.

4.2 Developing a culture of migration

4.2.1 Studies as early migration experiences

As Harzig, Hoerder and Gabaccia (2009) argue, patterns of migration are usually inter-regional, intra-state or rural-urban before they become international. My empirical findings convey with this view, as migration appears as a decision-making process forged throughout different lifecycles: For the vast majority of my interviewees (in 28

cases), the experience of migration developed along with the fact of growing up. Before arriving in the UK, the *Brains* had already experienced mobility, either within Mexico (internal circulation) or abroad. A good number of them claimed that they left their hometown accompanying their parents (family mobility), but the most frequent element sparking off initial mobility is the *Brains'* goal to enrol in an undergraduate degree, in one third of the cases. In this regard, the "student cities" of Mexico (Monterrey, Puebla, Guadalajara and above all, Mexico City) play an essential role in concentrating most of the students (and talent) within the country, a longstanding migration route that suggests an 'internal brain drain' (Medellín 1969)[20]. One of them is *Beto*, who left his hometown in Jalisco (Western Mexico) to study his undergraduate programme 300 miles away, in Mexico City:

> It wasn't something totally planned. I wanted to study Engineering or Physics, so I applied for both and I was admitted for the Physics undergraduate programme at the IPN, so I said, "I'll start Physics, and if I don't I like it, I'll move to Engineering", but I decided to stay. I loved it. At the IPN you have many options to study courses that even in foreign universities, like here in England, it's difficult to have in such a variety. I think at UNAM is similar, there is a wide range of courses and the teachers are generally very good. So I really enjoyed my undergraduate degree there.

As with *Beto*, the *Brains* constantly referred to the broad range of possibilities that universities in "student cities" offer as a motivation to leave their hometown. Early migration experiences are particularly notorious for those *Brains* who were born in smaller cities of Mexico, where migration is often perceived as an inevitable choice for moving forward in their lives:

> I have always enjoyed travelling. Being born in Hermosillo in 1979 [the capital city of the state of Sonora, Northern Mexico], I grew up in the midst of several economic crises during the 80's and the 90's, so it was very difficult for a young, middle-class person like me to travel to many places, even within Mexico. The route to travel from Hermosillo to other parts of Mexico was very complicated. So I grew up with this concern: the furthest place I had known when I was 12 years old was Tucson, Arizona [a city in the U.S., around 245 miles away from Hermosillo] because it was cheaper to buy things there for Christmas. The great mental shift for me came when I moved to Monterrey [the capital city of the state of Nuevo León, Northern Mexico, the third largest city of the country], to understand that there is a bigger Mexico, meet more people... In high school I attended to a bi-cultural school: my teachers were from the U.S., and they had lived in Berlin, Hong Kong (...) they were expatriates, and the experiences they shared stunned me. The profile of those teachers contributed greatly to open my mind to other possibilities, they made them more accessible. So with that new "chip" I travelled to Monterrey, where I met more people and travelled to more places. – Max

[20] Only three of my interviewees attended to a higher education institution different than the four "student cities" mentioned (Appendix I).

As with *Max*, smaller cities in Mexico have limited tertiary education possibilities, and are less diverse. As such, from the perspective of my interviewees, these spaces do not tend to attract foreigners, and are less welcoming of other views. By contrast, only eight of my interviewees never left their hometown until they moved abroad: seven are originally from Mexico City, which suggest that people from larger "student cities" have less incentives to migrate early.

On the other hand, some of my interviewees claimed to have experienced mobility for one year or less during the course of their undergraduate degrees. For Børing et. al. (2015, 812), this non-job mobility 'is very much bound up with the practice of science'. Such mobility may be driven by the need to access research collaborators, acquire new skills and techniques, gain access to materials or samples, or to specialised research equipment', and is highly valuable for the *Brains'* access to communities of interest and invisible colleges. These activities included student exchange programmes, social service, international conferences or competitions, and temporary stays (summer camps, workshops) in other laboratories and universities. These early opportunities would become "eye opener" experiences for them, which would stimulate further interest in looking for options abroad following the conclusion of their studies. Within this group, the case of *Víctor* is particularly relevant. Even when he studied all his degrees in Mexico (in different institutes of UNAM), the opportunity of attending an international conference meant accessing a valuable network, and eventually, to migration through a post-doctoral position:

> The first opportunity I had to visit the UK was through a grant from the UNAM, which was an open competition for resources. It was in the middle of my Ph.D. It wasn't much: Enough to pay for conferences and scientific events. One of the events that interested me the most was in Cambridge. During that event, I had the opportunity to meet one of the world leaders in my field of interest, structural biology of proteins. And it was very gratifying, that this illustrious character invited me to his lab to talk informally about the possibility of a post-doctoral stay in his laboratory. I told him I was still doing a doctorate, but he was very friendly and suggested me to stay in touch with people in his research group. So when I returned to Mexico I didn't lose contact with this person. Eventually, a research project was defined.

As *Víctor* shows, early mobility experiences relate closely to studies, where networks can be nurtured towards the shaping and belonging to communities of interest, which will be addressed in chapter 5. From this perspective, studies appear as decisive

opportunities to shape the decisions to migrate, first within the country, and later on, abroad.

Altogether, *Part One* addressed a series of common features among the *Brains* interviewed. Besides their nationality and highly-skilled status, an elite component is found in their social origin (Davey 2012), the ability to learn to speak English, to choose a university according to their early interests, to leave their hometowns in order to enrol in Mexican universities at different "student cities". However, this is not a homogeneous group, as differences exist between motivations to enrol in private or public institutions and their subsequent pursuit of work opportunities in academia or the private sector. However, the *Brains* resemble each other in they way they develop a culture of migration throughout different life episodes. From this perspective, early mobility experiences are important for shaping their identity. In many cases, the need to leave their hometown is perceived as a way to move forward in their careers, thus opening the path to different views and to further explore other places. The decision to leave Mexico thus appears as the product of a continuum of choices and experiences, by contrast to rational-choice theories, which base decisions on the disparities of wages. The three cases of early migration experiences identified (family mobility, undergraduate-studies mobility, and non-job mobility) appear as "eye-opener" events that influence later decisions to leave Mexico. *Part two* analyses how the *Brains* leave Mexico, where these previous migration experiences, followed by the pursuit of further academic training, play an essential role both for mobility and for the transformation of identity.

– Part two –

'I wanted to have a global career':

LEAVING MEXICO

As in early mobility experiences, the opportunity to study was found, once more, as the most relevant factor for leaving Mexico[21]. Even though the nature of this research is qualitative (and it is therefore important to take these numbers with a level of care), it is noteworthy that 29 of my interviewees initially left Mexico to study a post-

[21] After studies, work is the second most common factor, and will be analysed in-depth in chapter 5.

graduate programme abroad; among them, 27 enrolled at different universities across the UK. This points to British universities as the most relevant "pull factor" to enter –and eventually remain— in the UK among my sample. However, numerous factors influence this pursuit. *Part two* addresses these factors at micro and macro-levels.

4.3 Factors at the micro-level for pursuing postgraduate studies abroad

4.3.1 Factor 1. Between 'scientific vocation' and a 'moral equivalence'

My interviewees mentioned numerous reasons for pursuing postgraduate studies abroad. However, their responses pointed to frequent deliberations between the notions of a 'scientific vocation' and a 'moral equivalence' (addressed in chapter 2, section 2.4.2): on the one hand, the émigrés often portrayed science as universal –and some of them even considered themselves universal too—, which begets their motivation to experience new horizons as a valuable means in their career paths; a call for doing science is complemented by their expectations to achieve their own goals:

> As a scientist you know you have to leave the country, even if it's only for a season. It's important to know how things are done somewhere else in the world, and for personal reasons at that time I had nothing in particular that forced me to stay in Mexico, so as I was doing my undergraduate thesis in Irapuato [a city in Northern-Central Mexico] I decided that I would apply and see if I could do my Ph.D. abroad. I decided it was the best time for me to leave the country for a few years. – AGG

> My vision was to keep doing what I know, what I like, what I'm good at, we could say. Fortunately, scientific work, the way I see it, enables you to live anywhere in the world. With my expertise –or any scientist with the expertise he or she may have— can choose to live in Japan, Australia, Eastern Europe, Mexico, and so on. Basically, you may join a research centre anywhere in the world. As a scientist you have the ability to choose where you want to work. – AR

As the cases of *AGG* and *AR* show, the quest for new horizons to conduct scientific research emerges as an intrinsic part of academic life, and consequently as a valuable asset for their careers. As a prelude for Chapter 5 (where I will explore the professional experience of the *Brains* in the UK), these deliberations between 'scientific vocation' and 'moral equivalence' not only influence decisions to leave, but also are commonplace in their decisions to remain in the UK.

4.3.2 Factor 2. The pursuit of international experience

Like their peers working in academia, the vast majority of the *Brains* who work in the private sector also arrived to the UK to study initially (only *Emilio* and *Rius* came to work in transnational companies). In their case, motivations were more focused in the pursuit of gathering international experience, or in studying abroad as means for better professional opportunities:

> It's a long story. When I graduated from TEC of Monterrey [Mexican technological university in Northern Mexico], I started working for HSBC when they had just bought Bital [a former Mexican bank]. I started working there and all my bosses were either British or had studied something in the UK. Secondly, my experience as an exchange student in Canada opened my eyes to all educational possibilities that existed, and the differences in the educational model that I was getting at TEC. I combined these two elements –the aspiration to explore further and to study in a different model– besides the inspiration from my bosses at HSBC, and I wanted to have a global career. The options were either the U.S. or Europe, and within Europe was England.

As *Gabriel* mentions, the pursuit of a global career motivated his desire to leave Mexico, in order to learn under a different education system and to broaden his career to an international scope. Post-graduate studies would grant him "membership" to do so.

4.3.3 Factor 3. The relevance of Networks

As we have seen so far, the *Brains* commonly develop networks early in their careers, mainly with teachers and supervisors at school, bosses or colleagues at work, and fellow students or friends who influence or help them in their pursuit of a postgraduate programme abroad. In some cases, these networks turn out to be decisive for them to leave the country:

> I came to the UK because I had always wanted to do a PhD, but for work and family reasons –I have a daughter— I couldn't do it. Actually, I went to school pregnant when I was about to finish the last year of my Bachelor's degree, and I did my Master's whilst working and looking after my baby daughter. I thought it would be impossible for me to do a PhD with a baby, and in a country that I didn't know. I had to wait. So I finished my Master's at the IPN when my supervisor told me: "hey, there is an opportunity to take you abroad", but I didn't speak English (…) but my supervisor had already sent someone to the UK several years ago, and he himself was an Imperial College alumni. He contacted this person in Manchester and told him I didn't speak the language but he was told that there would be no problem; at that time it was not such a strict requirement by the Conacyt, and that's how I arrived [to the UK]. My daughter was older by then, and I thought it would be easier. – T

In *T's* case, her supervisor's guidance and networks in the UK were essential for her enrolment in a British doctoral programme, despite difficult challenges –looking after her daughter and the language. As in other cases, networks are highly influential to guide the decisions and destinations of the *Brains*. The creation and effects of communities of interest and invisible colleges in fostering mobility become clear in these cases. But besides these factors at the micro-level, there are other factors at the macro-level that influence the decisions to migrate. I will address them next.

4.4 Factors at the macro-level for pursuing postgraduate studies abroad

4.4.1 Factor 1. The role of Mexico: scholarships for postgraduate studies abroad

Scholarships play an essential role in the process of leaving the country, through either partial or complete funding from different sponsors. The most common sponsor among my interviewees is the Conacyt, followed by grants or partial funding from other Mexican institutions or British universities.

A contrast is found, however, depending on the *Brains'* work sector: All of those who currently work in academia were partially or fully sponsored by different institutions (mainly the Conacyt). By contrast, only half of the *Brains* who work in the private sector got a scholarship for studying their postgraduate degree; the rest had to turn to other funding options, such as loans, family support or personal savings. These *Brains* stated that they chose not to apply for the Conacyt funding due to their early intentions to remain in the UK after the completion of their studies.

The Conacyt scholarship programme

The Conacyt scholarship programme is the most important asset for talent formation in Mexico. From its creation in 1971, the programme has evolved in order to meet the changing needs of the country: During the 1970s, the objective was concentrated on increasing the number of professionals in the country. A decade later, the priority was to increase the number of teachers and researchers in the Mexican higher education institutions, as well as to support the creation of research centres across the country. During this time, only a limited number of doctoral degrees was sponsored by the

Conacyt, as the priorities were focused mainly on Master's programmes. However, in the 1990s the trends changed towards the support of doctoral programmes. From 1995 to 2000, the Conacyt increased its budget for the scholarship programme, and sought to establish international agreements with higher education institutions abroad (Conacyt 2000).

Throughout its existence, the scholarship programme has adjusted the criteria for grant-holders and in its funding scheme, in order to adapt to the national interests of Mexico and to meet the realities of globalisation. For 33 years (1971 to 2004) the programme consisted of a credit-scholarship scheme, in which grant holders were asked to reimburse the funds after the completion of their studies. Two of the *Brains* (*T* and *JuanR*) were grant-holders under this scheme:

> In those times, there were only credit-scholarships. I remember we had to return the money! [laughs]. We signed vouchers; there was a contract. You were asked to leave a guarantee, like the deed of a house: I left my apartment's deeds. – T

> One of the conditions was to return to Mexico and work as an academic, and there were other options, like reimbursing the funds. The option I took was the latter: even when I returned to Mexico, I didn't really join any academic institution, and I didn't reimburse the scholarship, either. When I came to UK the Conacyt contacted me, so I paid it in cash. - JuanR

In 2004 the Conacyt published new regulations, where the credit-scholarship scheme was replaced by a non-refundable subsidy, and the criteria for granting a scholarship were also adjusted: "Priority areas" for national development (established by the Conacyt and other stakeholders in higher education institutions and industry in Mexico) were included, particularly in those fields that were little developed in the country. For the first time, the Conacyt showed awareness of skilled migration, as its regulations (Article 28) stated the obligation of grant holders to establish links with the Conacyt, as well as a commitment to assist them in finding a position in their area of specialisation upon their return to the country. However, the Conacyt stuck with the obligation (in Article 30) to reimburse the funds for those grant holders who were abroad and did not return to Mexico after obtaining their degree (Conacyt 2004).

In this process, it is possible to observe important technical and management issues in regulations and subjectivity by Conacyt officials, which affected the effectiveness of the objective of establishing links established with the *Brains*. The anecdotes of *AGG*

and *Mariana*, who were grant holders during those changes, note that Articles 28 and 30 were not fulfilled, as they were actually exonerated from reimbursing the funds, even when they did not return to the country:

> I was very lucky because I was offered a postdoc at the National Institute for Medical Research [after the completion of her studies] in the UK. In that moment I decided that I would reimburse my credit-scholarship to the Conacyt, so I got in touch with them. It was a difficult period because they wanted me to pay my full salary every month, but two months after starting with negotiations on my monthly fee, they decided to exonerate all former credit-grant holders! They didn't even tell me a reason. That was the year in which the credits were over and they just exonerated all of the people who at that time had a credit-scholarship. It was a matter of administration; I believe they actually didn't have proper accounting and with the change of Presidential Administration [in 2000] the records must have been lost. – AGG

> It was a bit funny. I don't know if it's the norm or if I was just lucky or if it was the person whom I contacted [at the Conacyt]. I don't know. I had a credit-scholarship, where the condition was that you return to work to Mexico so that you were excused by the Conacyt to reimburse the fees they paid for your studies. When I finished, I contacted a gentleman who worked at the Scholarships Department of the Conacyt, and told him that I had already finished my degree (…) and he asked me if I would return to Mexico. I replied, with the intention to stay here, that I had an opportunity to apply for a work visa for two years, and that it was a unique opportunity that I wanted to try out. I asked if I could count on his support to stay, because in order to get this type of visa you have to submit a discharge letter from your sponsor. He said "yes", and told me to meet him in December in Mexico, as I would be there on holidays. In that meeting, he told me he already had started the process, and asked me to return in January, because the letter needed to be signed by the person in charge of scholarships. And so I went back on January 4 and I got the letter that stated that I had no debt with the Conacyt. Basically, it was a mere formality. – Mariana

In the case of *AGG*, she highlights how the Conacyt changed its regulations without any proper communication with the grant holders. *Mariana*, on the other hand, stresses the level of subjectivity by some of the Conacyt officials in the process of getting her discharge letter. In both cases, no additional efforts were made by the Conacyt to assist them in finding a position in Mexico, nor to engage them in collaboration projects with Mexico from a distance. The new regulations were not applied in reality.

Four years later, in 2008 and 2009, scholarship regulations were updated again to reinforce its role in highly-skilled formation in Mexico. The scholarship's scheme of subsidies was clarified (in Article 31) and as such, the reimbursement of the funds was no longer included (Conacyt 2008a). The realities of skilled migration seemed to be addressed again, as new criteria for engaging grant holders abroad after the completion of their studies was set up in Article 28:

ARTICLE 28. The CONACYT will consider any of the following cases as a proof of return to the country by the grant holder:

I. That the grant holder entered and maintained his residence in Mexico for a minimum period of six months from the conclusion of the studies;
II. That the grant holder is carrying out professional activities in Mexico;
III. That the grant holder is collaborating or providing services to institutions or organisations in the public or private of the country.

Under these criteria, clause III enabled the possibility for grant holders to stay abroad for the first time, as long as they engage in a long-distance collaboration project with an institution in Mexico. However, even when this new scheme conceded the possibility of no return, the anecdotes of my interviewees reveal once more a considerable level of subjectivity by some of the Conacyt officials in the interpretation of this clause, and very little monitoring of collaboration projects:

> (...) I was looking for a way back to Mexico, because I always had the moral commitment to return and reward, as it was signed in the contracts. Then came the possibility to stay. I was told here: "Why don't you stay for a post-doc?" And I said: "I have to return; I don't think it's that easy". Then I started to move and tried to get something in Mexico. I have a few acquaintances, both at the Institute of Engineering and at the CCADET [Center of Applied Sciences and Technological Development] of UNAM, and I asked everywhere: "Hey I'm interested in returning to do this... I want to do this and that... can we work together on something?" but unfortunately there was no positive response. There were many good intentions but nothing materialised. I was also looking for options in the Conacyt. I was sent job vacancies but never found something really out in the field where I was specialising, so I got in touch with people in the Conacyt and said: "hey look, I have this opportunity here, but I know I have to go back" and I don't know if they were too sincere or what, but I was told "so if you don't have a chance here, why don't you stay there to do that?" so I stayed to do a post-doc, and it's what I'm doing now (...) In order to get the discharge letter of the scholarship, I taught some courses through my contacts in the private sector: in aerospace industry they use some of the transducers I develop, so I explain what use they can give to them. So I gave some training courses at Aeromexico [a Mexican airline]. – Paco

> There was the intention to have a project with a Mexican company when I finished my PhD. In fact that's how I managed to meet the requirements of Conacyt regarding the discharge letter of the scholarship, because I had an on-going collaboration project. There was the intention, but it didn't materialise. – Rafa

Subjective interpretation of Conacyt regulations by its officials, and the lack of monitoring of the projects organised by former grant holders from a distance reveal a limited following-up of the results obtained from such collaborations. Of all the former grant holders who got their discharge letter from the Conacyt by establishing some kind of collaboration, only *Cris* continues to collaborate with an institution in Mexico from a distance, through a fixed contract:

> What I did to comply with the requirement, because there are like three different clauses [I, II, and III cited above], was to organise a collaboration with the university where I studied [the TEC of Monterrey] which still stands. It started when I graduated; I helped to teach one of the courses from here. To me it's very convenient (…) And that's how I obtained the discharge letter of the grant. I'm now formally employed by the university and I receive a salary that depends on the hours. After starting as a volunteer, I'm now a visiting lecturer. – Cris

To sum up, for many Mexican students (many of my interviewees included), the scholarship programme has meant an unsurpassed opportunity to acquire new skills abroad. However, as the anecdotes of *Paco*, *Rafa* and *Cris* showed, due to management issues and an observed level of subjectivity from some of the Conacyt officials to interpret the regulations of the scholarship programme, many students become grant holders with unclear regulations and incentives to contribute to Mexico from the UK. I will revisit this argument in chapter 6, which deals with the challenges of collaboration at a distance.

4.4.2 Factor 2. The role of the UK: the British soft power

Several UK initiatives play an important role as means for talent attraction by using its 'soft power'[22]. One of the most important ones is the British Council. Opened in 1943, the British Council was initially created with the objectives of providing English teaching, exam certification services and a library, but in the following decade its activities were expanded to the promotion of arts and cultural exchange between Mexico and the UK. In the 1960s, scientific exchange and scholarships were incorporated for the first time[23]. Since then, the British Council has been essential for establishing links at an academic level and to promote British universities in the country. Before the boom of ICTs, the British Council would act as a first point of contact between prospective students and British universities. Nowadays, the British Council organises university fairs (called "Education UK") in the three largest Mexican "student cities" (Mexico City, Guadalajara and Monterrey) to promote British universities and academic programmes. In these events, prospective students have the opportunity to speak with the international officers and staff of several universities in

[22] A term from Political Science, 'soft power' was coined by Joseph Nye (1990), to describe the ability of a country to shape preferences of others through persuasion, appeal or attraction strategies and methods, based on political values, culture, tech products, foreign policies, or credibility. In 2015, a Global Ranking of soft power ranked the UK in the 1st place worldwide; Mexico ranked 29th (McClory 2015).

[23] "History of the British Council in Mexico". URL: https://www.britishcouncil.org.mx/en/about/history [accessed 4th of April 2016].

the UK. In many cases, these events are highly influential in choosing the UK as a destination, as well as for promoting many British universities that are not widely known in Mexico:

> It was funny, because I always wanted to study abroad. I was looking in Belgium, Germany obviously because of Engineering, but I went to a fair organised by the British Council (…) and met a Chilean lady who was the Latin American Advisor of my university, which I've never heard of before, but she told me that I had the perfect profile because I was a woman and because I was interested in Engineering, so she started to send me information and it was interesting to find a Master's that I wanted to study, so she helped me throughout the application process. It took me a year because I started looking for scholarships, until I applied for a Conacyt scholarship and got it. – Mariana

Along with the Conacyt scholarship programme, the Chevening scholarship programme –sponsored by the British Embassy— has also played a relevant role for attracting Mexican students to several universities across the UK.

Other UK means for attraction rely on the promotion of its culture. Besides the British Council, there are several private British schools in Mexico, mainly in basic education and for English language. One of them is the Anglo-Mexican Institute for Culture. Like my case –I learnt English at that school for six years—, some of the *Brains* attended these schools, where they would not only be taught British English or curricular programmes, but would also be heavily exposed to the British culture:

> The reason [for his interest in the UK] is that when I started studying English I attended the Anglo-Mexican Institute for Culture. In addition to the language, they show you bits of the British culture. They insert you into it, you're immersed. Education was taught not only in terms of language, but in terms of the lifestyle and traditions of the country, too. So since I was very little I was attracted to the UK. When it was time to decide where I was going to go, for me it was an automatic choice. After seeing the curriculum, I saw the programme that would allow me access to a job back in Mexico. So, when I saw the option I decided to come for a Masters in that field. But things were mixed: my interest in British culture and the programme. – JuanR

Altogether, the anecdotes of my interviewees point to post-graduate programmes as the most important "pull" factor to the UK. Within this phenomenon, a scientific vocation and a pursuit of international experience motivate the *Brains* (as students) to leave, where networks also appeared important in shaping outflows towards the UK. With regard to macro-level factors, an often-unclear strategy in the Mexican scholarship programme faces a strategic focus in the UK to enhance its soft power that aims to attract Mexican talent to its territory through several means. In many ways, the notion of 'soft power' is also related to scientific diplomacy. As seen in chapter 2

(section 2.5.3), this term is relatively recent, and applied to diverse collaborative possibilities that science can enable and foster in the global era. For this reason, I will address the advantages and shortcomings of scientific diplomacy in chapter 6.

4.4.3 Factor 3. Why not the U.S.?

If the *Brains* are proficient in English, have access to scholarships, are highly-skilled, and the U.S. and Mexico share the largest migration corridor in the world, why did they choose not to go to there and headed to the UK instead? Despite a quarter have been in the U.S. for short visits, graduate studies and post-doctoral research positions, the majority of my informants claimed not to like the American culture. The *Brains* commonly referred the widespread prejudices against Mexicans and even the excessive closeness of the U.S. with Mexico, which encouraged them to experience different professional/scientific horizons:

> The Mexican community in the U.S. is very big, so I don't know how well the society accepts you, racially speaking. There is a lot of racism against Mexicans there, as migration to the U.S. is more indiscriminate than migration to Europe. In other words, I thought that in the U.S. I would be as any other Mexican, whereas being a Mexican in the UK is less common. Besides, I was always drawn to the history and tradition of the UK. – Tzotzil

Other *Brains* claimed that they found it 'easier' to enrol in British universities, given the absence of GRE/GMAT exams in many programmes, as well as the length of postgraduate programmes, both in Master's degrees (1-2 years in the UK vs 2-3 in the U.S.) and doctorates (3-4 in the UK vs 5-7 in the U.S.). Finally, a third group of *Brains* mentioned their preference for European lifestyle and diversity.

– Part three –

'I haven't decided to stay!'

A TRANSITION FROM MOBILITY TO MIGRATION?

As we saw in Chapter 2 (section 2.2.1), neo-classical economic approaches to skilled migration portray skilled individuals' decisions to leave their country based upon rational, thoughtful considerations. Notwithstanding, my interviewees' anecdotes point to a different narrative: decisions are not always calculated, but rather are a progressive set of choices that vary according to their experiences and interests at the time. Moreover, most of my interviewees consider themselves open to change, and

only a few (mainly those with more years abroad) consider their stay as permanent. As *Lola* depicts: *'I'm not sure, and I'm not the only Mexican who feels like this, if we will stay here forever... It's more like we are putting off our return'*. As stated by Harzig, Hoerder and Gabaccia (2009, 68), some become 'unwillingly permanent' because society in their country of origin remains uninviting, while others adjust and remain as 'unintentionally permanent' migrants. As mobility becomes an alternative to migration, more novel approaches to understand the migration experience are needed to expand the scope of analysis beyond "push" and "pull" factors.

In this regard, I use the notion of transnationalism to analyse the numerous aspects that influence the decisions of my interviewees to extend their stay in the UK. The responses obtained reveal three clear trends. The most common influence is related to professional aspects: following the conclusion of their degree, many *Brains* seek either to continue towards another post-graduate degree or to work in academia or the private sector. Secondly, during their stay in the UK, many *Brains* meet (and fall in love with) with other *Brains*. In this case, their partner's views, goals and occupations are highly influential in holding them back from returning to Mexico. Thirdly, during the *Brains'* stay in the UK, they face dynamic processes of 'acculturation, insertion and adjustment' (Harzig, Hoerder and Gabaccia (2009) to the country, which gather growing relevance in the lives of the *Brains* throughout time.

In the next section I will analyse the two first trends (professional motivations and the role of personal relationships), and I will leave for *Part three* the *Brains'* perception of the British lifestyle and living conditions. I portray these as "anchoring factors", in order to stress that they occur *during* the migration experience, and not *before* migration take place. I also use this term to emphasise how macro factors (such as work opportunities) are internalised by skilled individuals, as well as to depict the notion of continuity, and uncertainty, behind the decisions to remain.

4.5 Motivations to remain: the notion of *continuity*

Professional motivations were the most frequent responses among the émigrés' reasons to remain in the UK. In general, for those *Brains* who first entered to the UK to study a postgraduate degree, a notion of continuity ("to keep going") was found as a

valuable objective in their career development: more than half of the *Brains* who entered the country for a Master's degree continued towards a doctoral programme, and in the case of the *Brains* in the private sector, the most important motivation to remain had to do with the pursuit of work experience. Following their studies, skilled individuals expect to apply their skills, and perceive the UK as a valuable opportunity to do so.

As they study in the UK, the *Brains* become aware of the professional and social features of the country, which gives them an advantage with recruiters, and their academic qualifications from British qualifications grants them "membership" to valuable invisible colleges and communities of interest, and consequently, to the British labour market. Within this group, the pursuit of better professional opportunities was planned along with enrolment in post-graduate studies: *'(…) that was my objective since I left to study my Master's (…) From the very beginning I saw it as an opportunity to leave the country',* said *Chinos*, an engineer who studied his Master's and doctoral degrees in the UK, and is now employed at a British start-up company.

As for the *Brains* in academia, it is noteworthy that two-thirds of them returned to Mexico for a period of time (ranging one to three years) to work, but eventually decided to leave the country again, in order to continue their training in the UK. Within this group, most of the doctoral graduates (two-thirds) sought to continue their careers towards post-doctoral positions. Given their relevance, I will address post-doctoral positions next.

4.5.1 Post-doctoral positions: "anchoring" and "pull" factors

Post-doctoral positions were found as valuable opportunities (and means) for the *Brains* to extend their stay in the UK. These émigrés stressed that their doctoral research is in many ways related to their work as post-docs, as the vast majority were offered a post-doctoral position in the same higher education institution. For the *Brains* who work in academia, doctoral programmes were often conceived as studies that need to be complemented by actual work experience, as a crucial step to follow in their academic careers. Relevant motivations, such as an interest to eventually define

their own research topics (and eventually, to lead their own research groups), publishing in order to disseminate their research, or working in a renowned research group are the most important reasons for the *Brains* in academia to extend their stay in the UK:

> I wouldn't go as far as saying that "I decided to stay". I never thought I would stay for so long. I was sure that after finishing my doctorate I would go back to Mexico, but I stayed because I didn't publish during my PhD, and in my field if you don't publish you're dead. Having a PhD abroad without papers meant suicide, and I also felt very "dumb" to return. I had learnt, yes, but I still lacked experience. So I said: "Well, I'll stay to gain more experience, and then I'll be more qualified to return". That's why at the end of the PhD I stayed for a post-doc. – Pinky

> Well I haven't decided to stay yet. There have been several stages. I don't think I decided at a time, but it has been rather progressive… And not only because of the Home Office! [laughs]. The reason I applied for a visa to be a postgraduate student was because I wanted to continue in the project where I was working, I wanted to be able to finish the project. There was still material to publish in order to close that cycle. That's what motivated me to apply for a post-doctoral stay, where you become part of the staff of a department: you are taxed now… it's an actual job. – Rafa

As *Pinky* highlights, publishing is highly relevant for careers in academia, and the chance of continuing with her research were fundamental motivations for her to take the opportunity to work as a post-doc in the UK. Likewise, *Rafa* highlights the relevance of closing the research project that started along with his PhD, and moreover, stresses the role of post-doctoral positions as jobs, and not as studies, a fundamental conceptual difference between the UK and Mexico. Reflexivity processes become clear in this part, where post-doctoral positions act as powerful "anchoring factors" for the graduates from doctoral programmes in the UK. As *Rafa* recalled, all three of his PhD fellows who started the programme remained in the UK for post-doctoral research with him.

As *Rafa* and *Pinky's* cases show, post-doctoral positions pave the way for a career in British academia. Among many examples, the account of *T* is particularly interesting. Section 4.3.3 addressed the challenges she met in order to enrol in a postgraduate degree in the UK –namely, her baby daughter and her limited English skills. As time went by, however, the progression through post-doctoral positions meant valuable expertise in British academia, and a series of life experiences:

> I never meant to stay (…) from the first moment I told my supervisor: "I came for three years, not a day more, not a day less" (…) After the three years went by and my daughter was a little older, my supervisor told me: "stay because I have got money to continue your project. Stay for six

> months, and then we'll get someone to replace you". I had been there for three years but had no experience, so I applied for the position (…) and I got it! so they kept giving us money until I lasted there for another three years, and I already knew everything that I had to do. By then I had grown as a researcher. You're not a student anymore. I made many projects. I put my hands in many things, and published a lot in that time (…) Then came the moment when I told my boss: "You know what? I have given everything I can here, so I'm going back to Mexico" (...) and a few days later I received a call from the head of the school, and asked me if I could go see him. He offered me to work with him, managing all his projects. He said: "you're going to manage research, you won't do it; and you're going to handle a European project that will give you the opportunity to travel around Europe". And he caught my attention (…) he gave me the opportunity to manage another three European projects, and that gave me access to the continent... I learnt. By then I already was a Senior Research Fellow. Then my boss told me that the UMIS and the University of Manchester would merge and that it would open new academic positions, and he offered one to me. I said no, because my idea was still to return to Mexico (…) But I had a very good opportunity because there were no people with my skills around. I talked to my family again, and said: "if I get it, we stay, and if I don't we'll return to Mexico". But by then my daughter was older, and told me: "you may leave, but I won't. You go". So all of that contributed for me to stay. I went to the interview; by then I had more experience in the British system, and that's how I got the position of Lecturer. – T

As the case of *T* shows, the transnational perspective allows an interpretation of post-doctoral positions as relevant "anchoring" factors to the UK, where unintended decisions to stay coexist with taking emerging or unsuspected opportunities. Under this perspective, her progression through different academic positions also paved the way for a growing attachment to the UK on personal and professional grounds. By the time she had applied for the position of Lecturer, her daughter was older, and she had also met a British partner.

On the other hand, post-doctoral positions also constitute the most relevant "pull factors" for those *Brains* interviewed who were trained entirely in Mexico, as in the case of *AR*. Conceptual differences between post-doctoral positions in Mexico and the UK play a relevant role:

> As I was about to finish the doctoral programme, I decided to look for additional experience. Actually, I was interested in seeing how science was done in the U.S.. Once I was there, I wanted to see how science was done in Europe, so I looked for a post-doctoral stay. Unlike Mexico, the post-doc is a proper job. In Mexico you are in limbo. It's a scholarship, you're a student but you're not considered a worker, paying taxes. But here the post-doc is a job where you have the flexibility to decide whether to go to industry or to stay in academia, but you're paying taxes. So I looked for a job as a post-doc in Europe (…) Actually, my boss in the U.S. offered me a post-doc and asked if I wanted to stay there, but I explained to her my intentions and she supported me in everything. She even got me interviews with her friends. – AR

In the case of *AR*, the motivations to explore new scientific horizons in his career paved the way towards the U.S. first, and to the UK later. In this regard, the access to communities of interest appears as powerful factors facilitating migration.

To sum up, under a notion of continuity, post-graduate studies in the UK mean an opportunity to gather work experience, for most of the *Brains* in the private sector. On the other hand, for most of the *Brains* in academia, post-graduate studies represent means to shape an academic career, particularly for the doctoral graduates, who applied in a majority (two-thirds) for post-doctoral positions. In the case of the *Brains* who were entirely trained in Mexico, post-doctoral positions appeared as relevant "pull-factors" to the UK, mostly because of the conceptual differences of post-doctoral positions in Mexico ("as a student") and the UK ("as a worker"). Within this continuum, I will analyse the second most important factor, which is related to *when Brains meet (and fall in love with) other Brains*.

4.5.2 Personal motivations: When *Brains* meet (and fall in love with) other *Brains*

Being abroad opens a wide range of possibilities in the life experiences of my informants. Regardless of their work sector, personal relationships were found as significant "anchoring" factors that heavily influence their decision to remain in the country, and also contribute significantly to the development of a transnational identity, as the *Brains* develop connections with the UK and also maintain ties with Mexico from a distance. I will address how these two elements (motivations to remain and transnational identity) take shape in two kinds of couples: Mexicans with foreign partners, and Mexicans with Mexican partners.

4.5.2.1 Mexicans with foreign partners

Among those *Brains* who initially came to the UK to study, more than half (17) met their partner at some point during their studies. Except in one case, all of them are foreign, and in all cases the partners of my interviewees are also highly-skilled. This is relevant not only as a trend (*Brains tend to meet other Brains*), but also because their partner's occupation has a noticeable influence on the *Brains'* reflexivity process to remain/to return to the UK after concluding their studies. Both men and women were found to weigh their partner's career in their considerations of an eventual return to Mexico:

> I returned to Mexico because I got job, and to help my family, obviously, but I was lucky to keep in touch with the friends I made during my Master's. In one of our trips was my now wife, and we

> still had good chemistry. It was in June 2009 when we sat down and said, "we must do something to coincide". In that moment my decision is to go to London, because she worked there, and for me it was easier to go to London because I already had studies in the UK, I spoke the language, and she didn't speak Spanish and it wasn't so easy for her to go to Mexico (...) It was a personal decision, because the job I took when I came back was three levels lower from the one I already had in Mexico. – Max

Max's anecdote illustrates a pattern among the *Brains*, regarding a motivation to return/or remain in the UK in order to reunite with their partners, where even career sacrifices are commonly made. In Mexico, some of these *Brains* already worked and achieved good positions, but as *Max* note, his "membership" to the UK labour market (namely, British postgraduate studies and language) is highly influential in choosing the UK as a destination, as he stresses the difficulties for his partner to go to Mexico, due to the language and living conditions. These two factors ("membership" and difficulties for partners) were identified as the most common reason to remain in the UK. Moreover, these claims were confirmed by those *Brains* who actually tried to get established in Mexico with their partners, but eventually left the country because of different difficulties:

> When I was studying my PhD I met my now wife, mother of my children. She is a German citizen and lived here in London. We got married when I was doing a research stay in Germany in 2002. After my PhD we returned to Mexico, and I got a job at UNAM, in the Faculty of Chemistry (...) In 2009 I resigned, and when we decided to leave, London was the most viable option, because she owned a flat here (…) My wife found very difficult conditions to live in Mexico City with the children. It's tough. Children don't have the same possibilities as here. Many green areas, and more open spaces so that children can go here or there. In Mexico it's more like, "don't take your children out on the street, they will be kidnapped, or ran over". It's a bit overwhelming, and that was the reason number 1, to provide a better environment for my family. – Quiquillo

Quiquillo's quote reveals, on the one hand, how skilled émigrés can become transmigrants: Mexican scientist, who graduated from a doctoral programme in the UK, married to a German, made a research stay in Germany, lived in Mexico City, has two Mexican/German children, and now lives in the UK. In his own words, he is an *'academic gipsy'*. But perhaps more important, he shows how different rationalities operate: as we saw in chapter 2 (section 2.2.5), partnering and parenting are common factors influencing the decisions to stay/return to the UK. Even though *Quiquillo* shows transnational behaviour, relevant "push" factors –commonly noted in the neo-classical economic theories— such as an adverse social environment in Mexico were highly influential in his decision to quit his position as a researcher at UNAM and look for

professional opportunities in the UK, in order to provide a safer environment to his family.

But despite the social issues in Mexico (that will be further explored in *Part five* of this chapter), in the vast majority of cases, the main difficulties stressed by the *Brains* for an eventual return to Mexico referred to the professional landscape in the country:

> I met my wife here [in the UK], when I was doing my PhD (…) Up to a point yes, she did play a role [to remain in the UK], but in that moment of my life things were relatively flexible, because she is a doctor and was finishing her undergrad, so it was a matter of choosing where to go, and it wasn't really much of a difference if she started working here, or in Canada or the U.S. (…) But I believe it was more of a professional decision not to return to Mexico, specially about her. The problem was that after my Master's, I came back to Mexico, but things were going terribly wrong that year, because it was the year of Presidential elections. That was frustrating and relatively traumatising. That's when I saw Mexico as a distant option. To me, options were the UK, the U.S., Canada and only then Mexico, if none of the previous three worked (...) But I think she would consider it. It's a matter of personality, but my wife likes Mexico. She likes the country a lot in the social and cultural aspects, but she also sees the horror that Mexico can be in the professional aspect, because she is a doctor and has heard of terrible experiences from my family. She realises how the health system works in Mexico, and when you compare it to the health system in England, which is nothing to brag about either, it frightens her. – Salvador

Salvador shows how, even though his partner is highly-skilled and has the possibility to live in different countries as a doctor, he acknowledges the limitations of the professional landscape in Mexico, which, to his eyes, contrasts with the positive social and cultural landscape of the country. On the other hand, *Cris* highlighted further professional limitations for her husband in Mexico:

> It had a lot to do with my relationship with my partner [her decision to stay]. It was very difficult that he could come to Mexico –he is also doing research— and in Mexico scientific research has many problems, especially we suffer because of bureaucracy, but it's also about the system, how it works to get funding. Medical research is very expensive, and I really could not guarantee him that he could come and work in a research project that would be valuable for his career. I think it was the decisive factor. He likes Mexico and I think he would have liked to live there, but the professional part was really complicated. – Cris

In *Cris'* anecdote, budget differentials in her partner's work are fundamental migration-inhibitors for a decision to return to Mexico. As with *Cris* and *Salvador*, the main decision identified to remain in the UK among my interviewees is widely professionally-motivated, not only because of work opportunities for the *Brains*, but also for their partners. The relevance of these differences between Mexico and the UK labour market will be further explored, under the notion of "imbalances", in chapter 5 (section 5.3).

4.5.2.2 Mexican couples also tend to stay

Despite having the same nationality, Mexican couples also tend to stay in the UK. The motivations found are also related to their level of skills and the opportunities they find to work in the UK, and in second place, the lifestyle they experience in the country. *Mariana*, for instance, met her Mexican partner (*Paco*, also interviewed in this study) in the UK during their postgraduate studies and decided to marry three years later. To her, being with a partner gave her the assurance to look for professional opportunities in Britain:

> The truth is, I stayed because I'm in a relationship with my husband. If he hadn't been here, I don't know if I would have dared to do it. At that time we were only dating, and I also had the opportunity to apply for a work visa, as I studied a postgraduate degree here, and of course I was attracted to the idea, and thought, "Well, I will have the experience of having worked abroad. That's good for my CV and to find a better job back in Mexico". I got the visa and stayed the first two years. – Mariana

As with *Mariana*, Mexican couples make use of the "membership" that a British degree grants for accessing the labour market of the country. But besides *Paco* and *Mariana*, my sample includes five men who brought their partners with them when they came to the UK to work or study. *Víctor* and *AR,* for instance, obtained all their degrees and met their partners in Mexico. When they left the country for post-doctoral positions, they emphasised that their partners' occupation also played an important role in their decision to remain in the UK:

> The places that interested me were Milan, in Italy, and Oxford in England. Both invited me for an interview and both offered me work. I decided to travel with my wife, and in either of the two places where she would feel more comfortable, that would be the place of my choice. After we arrived in London and then took the train to Oxford she said, "this is the place" (…) [He stayed in the UK because] In professional matters, it would allow me to grow. Secondly, family issues. We realised that my wife could also work here. So, that would help us to live in better conditions. The U.S. visa didn't allow that, so all the support came from me. In the U.S. life was expensive and not with a very good salary. I felt I could support her more here, where she could find a position to grow professionally. – AR

> I got the post-doctoral fellowship and came here. My wife was a little reluctant to come because she had a permanent job at the Children's Hospital of Mexico, but she eventually pondered and decided to come over. From what I can see she's happy in the professional aspect. It has been very stimulating to be able to relate professionally, both for her and for me. – Víctor

As *Víctor* and *AR's* cases show, the opportunities to work and develop a career in the UK are also fundamental drivers for Mexican couples. Likewise, in the case of the two women who were entirely trained in Mexico and left the country for post-doctoral

positions (*Erasmus* and *Starignus),* their migration was driven by their intention to join their partners. In the case of *Erasmus*, the networks she established in advance were decisive for her arrival to the UK:

> I Initially left the country after I graduated from my PhD, because I was offered a post-doc in New York, so I was there for a year. My boyfriend at the time –my husband today— was doing a Master's degree in Manchester, and was offered a job in Birmingham. So after a year we decided that living apart had been enough, so I came here. I must say that my arrival was lucky, because as part of my PhD I had come to visit a professor at Oxford. They wanted me to teach them a technique. I was there for three weeks and we did research that ultimately was part of my doctoral thesis and later on got published. So whilst I was in New York looking for something, my first impulse was, "I'll write to him [the professor] and see if he has any opportunities" and I thought that he would answer "yes, but let me get a grant first". I contacted him in July, and to my surprise he said it was perfect but that I had to be there immediately. I sent all my papers and I started working there in October, 2006. – Erasmus

In this section, we have noted the relevance and development of a 'transnational intimacy', as King (2002) calls it, which involves traveling, studies, partnering, and professional motivations. Regardless of their origins (Mexicans with foreign partners, and Mexicans with Mexican partners) the decisions to remain seem to be highly influenced by the differences in the labour market for the highly-skilled between both countries, which involve opportunities both for the *Brains* and for their partners. In many cases, the *Brains* with previous work experience in Mexico had to make career sacrifices to join their partners in the UK. Perhaps, as King (2002, 99) mentions, 'as far as migration factors are concerned, "love conquers all"'.

As a summary, Figure 10 shows the main "pull" and "anchoring" factors to the UK mentioned by the *Brains*, grouped by their maximum level of studies. Their nicknames may appear more than once, given that they mentioned more than one reason to prolong their stay in the UK. The notion of *continuity* in professional motivations (which involves upgrading towards a doctoral degree, a post-doctoral position, or other work opportunities), and the relevance of love (or 'transnational intimacy') are clearly visible in this Figure:

FIGURE 10.

"PULL" & "ANCHORING" FACTORS TO THE UK

Group	Reasons to remain	Number of cases	*Brains*
MA's	Upgraded towards a doctoral programme	9	*Raúl, A, Lola, Salvador, JuanR, Tzotzil, Mango, Puma, Chinos*
	Met his/her partner	6	*Thelonious (broke-up later), Mariana, Javier, Max, Étienne, Gabriel*
	Work opportunities	5	*Javier, Gabriel, Juan Pablo, Mango, Mariana*
PhD's	Post-doctoral position	16	*Pinky, DJC, Paco, Cris, Beto, T, Juan, Tzotzil, Charantulo, Raul, Rafa, Puma, UKMEX, AGG, T, Quiquillo*
	Met his/her partner	13	*Paco,Cris, Beto, Tzotzil, Pinky, Raúl (broke-up later), Salvador, JuanR, Lola, Erasmus, Puma , AGG, Quiquillo*
	Work opportunities	7	*Alejandro, Salvador, AGG, T, A, Chinos, Salvador*
	British lifestyle	4	*Mango, Erasmus, Charantulo, JuanR*
	Family	3	*T, Tzotzil, Quiquillo*
Brains trained entirely in Mexico	Post-doc	4	*Starignus, Erasmus, Víctor, AR*
	Couple	5	*Starignus, Erasmus, AR, Antonio, Víctor*
	Work opportunities	6	*AR, Erasmus, AR, Emilio, Rius, Antonio*

Within the migrants' perspective, we have seen how transnational identity develops from experiencing these "pull" and "anchoring" factors in the UK. In this regard, *Part four* addresses how acculturation and adaptation processes take place, and what the lives of the *Brains* are like in the UK.

– Part four –

"You win some, you lose some":

THE *BRAINS'* LIFE IN THE UK

Assumptions from neo-classical economic theories (and I must say, my own initial belief) conceived migration as means by which individuals achieve a better life, with particular emphasis in socio-economic status. Notwithstanding, the migration experience of my interviewees in the UK revealed a different picture, based on weighing both adverse and positive conditions, where benefits also entail sacrifices. *Part four* addresses my interviewees' main perceptions and comparisons between their past and actual lives in Mexico and the UK, where reflexivity processes reveal a deliberation between objectivities and subjectivities.

The émigrés' perceptions and comparisons are organised in four categories[24]: i. Living conditions (security, public services, the environment, weather, gastronomy, and society); ii. Socialisation (or the facility for developing personal relationships); iii. Living standards (wage differentials and purchasing power, income inequality); and iv. Family and long-time friendships.

4.6 Living conditions

As part of their reflexivity process, my interviewees highlighted several aspects where the UK is depicted as a favourable country to live. In this vein, security is the most valued factor where they perceived an advantage in comparison to their past life. In this aspect, Mexico is widely pondered in terms of its widespread criminality, violence and lack of a rule of Law across the country. As a result, this feeling of insecurity is one of the most serious factors inhibiting the possibility to return to Mexico:

> In Mexico I obviously got my car stolen, my grandparents have been extorted, we have suffered express kidnapping in my family, my mom has properties and had a squatter once, houses next to my mom's have been robbed… those are things that make me feel I wouldn't feel confident to have the life that I have here, because you have to take a low profile in everything, and that restricts how you interact with others, and now I'm in the phase of starting a family and raising children, and what's more I have a foreign partner, so I feel it's a better environment here, in a city like London. – Gabriel

> What I've found here is a very safe environment, in general. There is also criminality here, but I have never heard that the "Cartel fired gunshots in Paddington, and many Englishmen died". That's something that has marked me a lot, and according to my values, that's important. – Antonio

In his account, *Gabriel* stressed a sharp contrast between harsh first-hand experiences in Mexico and the UK with regard to security, which influenced his decision to remain in the UK. On the other hand, *Antonio* recalled the shootings between drug cartels, which often occur in public spaces of Mexico. These perceptions are confirmed by official reports in Mexico: according to a survey carried out by the Mexican Institute for Statistics and Geography (INEGI), insecurity is the most worrisome issue for the population, where 72.4% of the Mexicans feel insecure in public places (INEGI 2016).

[24] During the analysis of the *Brains'* life in the UK, I intended to organise their perceptions and views in scholarly-sound categories, but as Mc Nally (2009) and Barbaccia et. al. (2013) show, there are no definitive definitions on terms like 'quality of life' or 'living standards', and its numerous understandings frequently overlap between one or the other. For this reason, I defined my own categories.

This contributes to explain why security appeared as the most valued factor for the *Brains'* current lives in the UK.

The second most highly-regarded factor has to do with public services. For the vast majority of the *Brains*, the quality of public education and public health services in the UK are important factors to consider in their current lives:

> There are many things here that you don't need to pay for: the medical services, for example. In Mexico you have that option, but many people go for private services and that can evaporate your savings when you fall into a disease that can't be treated easily. These services are very important. The standard of living also helps in the sense that we don't have to pay for the education of our children. Primary, secondary and high school are free. That also allows you to live with certain standards, because you are sending your children where everyone goes, and you don't need to use part of your money on this. – AR

As *AR* mentions, public services are not only linked to quality, but also to equality: the perception of a lower quality of public services fosters private education and health services in Mexico. However, this phenomenon was related to the widespread inequalities in the country, as these services are only available to privileged socioeconomic groups who can afford them. In the same vein, a good network of public transport was considered as an enabler of a more comfortable life, whereas in Mexico my interviewees recalled needing a car to travel, particularly in big cities like Mexico City, where higher levels of traffic affect their well-being. Likewise, the existence of a healthier environment and green areas add to the quality of life of the Mexicans in the UK, particularly for those who are originally from Mexico City, who consider that smog and pollution were highly unpleasant elements in their every-day life. Environment is specially valued among those *Brains* who live in smaller British cities.

Within the social landscape, the UK also stood out as a "better" country in terms of its equality, openness and meritocracy, which enables social mobility and more inclusion:

> From the social point of view, it's a country that provides opportunities for its citizens: those who want to progress, those who want a good education (...) I think it's a country with many opportunities. It's also a meritocratic society, where if you work and you apply yourself you can achieve very important things. So from that standpoint, I think it's a better country. – JuanR

As *JuanR* shows, meritocracy is also related to skilled migration, as a suitable social landscape motivates skilled individuals to pursue professional opportunities and

achieve their personal expectations[25]. Likewise, the *Brains* appreciate the existence of an active civil society that gets involved in the country's public issues, as well as better conditions in terms of gender equality. The social landscape is encouraging to be politically informed, and in many cases politically active, which constitutes an essential factor for discussing their views on the Mexican government at a distance, as we will observe in chapters 5 and 6.

Cosmopolitanism appeared as another highly-regarded element in the *Brains'* life in the UK. The opportunity to meet people from many ethnic backgrounds is an enriching and "mind-opening" experience:

> I love London (…). Here most of the people are foreign, so you belong, you belong in the same way everyone belongs because no one belongs. Nobody is from here, so everybody is from here, because you don't need to be of a certain colour, or behave in a certain way to belong, and that sets you free. You can paint your hair pink, green... do whatever you want and people don't care. London being so cosmopolitan for me is sensational. – Lola

The cosmopolitan character of Britain, particularly in a 'global city' like London (Sassen 2001) is an important asset in the process of transformation of the *Brains'* identity, as they are able to "belong but not belong" (as *Lola* puts it), and generate new subjectivities not only from the experience of living in a different country, but also by meeting people from a vast array of cultural and ethnic backgrounds.

However, the émigrés also pondered several living conditions that they valued from their life in Mexico, particularly in terms of gastronomy, the weather, traditions, and nature (beaches). Practically all of my interviewees mentioned that these conditions were "much better" in Mexico, as *Raúl* says: *'the food, the sun, the social environment, more relaxed, more informal as well, but happier, that we miss so much around here. When I go there, I feel relaxed as well'*. From this point, I will address society and socialisation in the next section.

4.7 Socialisation

Developing personal relationships was pointed out as one of the most important challenges in the *Brains'* insertion into British society. For the vast majority, there is a

[25] I will analyse further how this social landscape also has implications on the British working conditions in chapter 5.

sharp difference between the Mexican and the British society in terms of socialisation, as people in Mexico were constantly referred to as "warmer", versus "colder" people in the UK. Mexican society tends to be more open in terms of socialisation, which allows people to relate more easily, which contributes to a sense of belonging:

> As for socialisation, here it is difficult to form a group of friends, at least in the sense of friendship that we understand in Mexico, where it's a very close bond and you know the life and work of each person with whom you feel identified. You know their relatives, you gather frequently... that doesn't happen here, particularly in the south of England: People privilege their privacy, and the level of interaction is very poor. That has been the hardest part to take, not so much for me, because I started to live on my own since I was 16, so I'm more detached, but for my wife, because her family nucleus is very close. – Víctor

As with *Víctor's* experience, socialisation is an additional challenge for Mexicans, who besides getting competitive positions professionally, must also 'negotiate' their social insertion into British society. Socialisation is thus an important component in the transition of the *Brains'* identity, as it portrays not only how Mexicans think of Mexico and perform their *Mexicanhood* from the UK, but it also involves how they feel about, adapt and interact within British society, comprised of many other transmigrant groups.

4.8 Family and long-time friendships

For the vast majority of the *Brains*, leaving their relatives (including their own children, in a couple of cases) and long-time friends behind was mentioned as the most difficult challenge they must face in their decision to remain in the UK. In this context, family becomes a fundamental element for the development of transnational behaviour, as they prompt permanent efforts within skilled émigrés to stay connected to "home" (as many of them referred to Mexico). Even though work opportunities and living conditions are important factors for a fulfilling migration experience in the UK, it is clear that roots are still important in the lives of the *Brains,* where the decisions to leave often entail harsh sacrifices:

> It's not easy, because my parents are older now. My dad had a heart attack the opening day of the Olympic Games here [London 2012]. Precisely because they are in the final stage of their life, I miss them a lot. Of course I also miss my siblings. My sister is a journalist in Mexico City and my brother works as a carpenter in Guadalajara, and of course I miss my friends. – Étienne

Along with close ties of familial relationships, family support was also highly-regarded in the *Brains'* past life. In this aspect, the anecdotes of my interviewees revealed how the initial decisions to migrate are constructed collectively in many ways. In a good number of cases, the role of families was decisive, as they provided financial or moral support to the initial desire of the skilled individual to migrate, as *UKMEX* recalls: *'In my family they are conscious that I have to go where the best opportunities are'.* Likewise, back in section 4.5.2 we saw how often the *Brains* establish personal relationships during their stay in the UK. For those who have formed a multi-cultural family in the UK and have children, their relatives and long-time friends in Mexico also represent a valuable support network, which cannot be easily compensated in their receiving country:

> I think now, in our current situation is much more difficult because of my baby, because it's the first grandchild, so my parents resent it a little. With my sister we always keep in touch, we are very close. She lived abroad for a long time, and she returned to Mexico a few years ago, so we have formed a different dynamic. We miss each other deeply, but we deal with it quite well. With my parents is different though, because they don't have that dynamic, but since I can remember, my dad always emphasised that we have to follow our dreams and do what we have to do, and he says that it doesn't matter where we go. It's okay if we're not together, as long as we stay connected. – Cris

By contrast with professional reasons as the main motivation for the Brains to leave the country and remain abroad (as addressed in section 4.5) family and long-time friends appeared as the main factor that influence the *Brains'* intentions to return to Mexico (albeit temporarily, in most cases).

4.9 Living standards: are better wages in the UK a myth?

Neo-classical economic theories on the brain drain suggested that migration is greatly encouraged by the higher salaries that émigrés earn in receiving countries. In principle this would sound logical if we consider as a starting point the abysmal difference in the monthly minimum wage[26] in the UK (of around £1,150) by comparison to Mexico (of less than £60[27]). However, the empirical evidence contests such assumptions in

[26] Currency conversion rates used (as of 5th of December 2016) = 26 Mexican pesos (MXN) for 1 British Pound (GBP), according to the XE Currency Converter website: http://www.xe.com/en/currencyconverter/.

[27] Sources for estimating monthly minimum wages: In the UK (£7.20 per hour: https://www.gov.uk/national-minimum-wage-rates); In Mexico (£2.80 per day: National Commission for Minimum Wages in Mexico (http://www.sat.gob.mx/informacion_fiscal/tablas_indicadores/Paginas/salarios_minimos.aspx [accessed 5th of December 2016]).

different ways. Given the vast array of occupations of my interviewees, it is not possible to establish a precise comparison in each case, but almost half of them claimed to do "better" or "much better" in terms of income in the UK, while the other half claimed to do "worse" or "much worse" (a minority claimed to earn similar wages). In this regard, the *Brains'* recounts revealed three main factors to be taken into consideration in this part: the Purchasing Power Parity (PPP[28]), the extended presence of additional compensations in Mexico, and above all, the great income inequalities in Mexico, a phenomenon that is usually overlooked in migration studies.

The PPP was first suggested by one of my interviewees (*Max*), as a fundamental element for assessing the living standards in Mexico and the UK. In terms of the PPP, the balance favours Mexico: my interviewees claimed that their money lasted longer, which allowed them to have access to more goods (own a car, own a house, have a domestic servant…) than they can afford in the UK, a much more expensive country in terms of living expenses:

> We now have a double income [with his wife]: 30% of my salary goes to housing (in Mexico it wasn't nearly close to 15%). The cost of transportation is cheaper here (but in Mexico you can own a car). Food, well it depends. I'd say it's still higher in Mexico, but I feel the tax I'm paying works better here. The services you have as a citizen are better spent here – Max

As *Max* claims, effective use of taxes in the provision of services (transport, health, education) involves benefits that migrants appreciate in the UK, in comparison to the services they would need to pay for in Mexico (mostly private education, private health services and private transport), in order to even out the imbalances in regard to quality.

As stated before, perceptions on wages are split, for both the *Brains* in academia and the private sector. However, in academia, the *Brains* who claimed to get paid "much better" were those who hold post-doctoral positions. Conceptual differences between post-docs (addressed in section 4.5.1) seem to have an effect on wages, as *Rafa* puts it: *'If you look at the scholarship grants from the Conacyt for post-doctoral stays*

[28] According to *The Princeton Encyclopedia of the World Economy* (2009, 942): 'The modern definition of PPP, usually credited to Gustav Cassel (1918), is quite intuitive: when measured in the same unit, the monies of different countries should have the same purchasing power and command the same basket of goods (…) Another way to interpret the parity condition is that the exchange rate between two countries should equal the ratio of the countries' price levels'.

abroad, it is much, much less money than post-doctoral salaries in Europe'. Paradoxically, wages in academia were observed to lose their superiority in the UK as researchers reach more senior positions. Even though Professors (the highest academic position in Britain) can negotiate their salaries with their university, senior researchers in Mexico can complement their salary with additional compensations, mostly from advisory services, conferences, grants, *aguinaldos* (a compulsory extra-month's pay, according to the Mexican labour law), and from becoming members of the National Researchers System (SNI). As observed in the introductory chapter, the SNI is an initiative of the Mexican government to provide an additional compensation for researchers, with the goal of increasing scientific productivity and retaining them in the country. From this viewpoint, even though the basic salaries of researchers in Mexico are low in comparison to international standards (Altbach et. al. 2012; Maldonado 2016b), studies estimate that income can rise up to 63% because of these compensations (Ordorika 2004). In this regard, *T's* anecdote is particularly illustrative, as she has reached the level of Professor in the UK (refer to sections 4.3.3 and 4.5.1 for more information on *T*) and also had relevant working experience in Mexico:

> Mexico has many benefits: the SNI is one, if you are in the IPN you get points for doing this and that, and in the end your salary is bigger. You also have access to other scholarships (...) eventually they have more benefits than us, plus you don't have bonds in UK, you don't have *aguinaldos* (…) Here we don't have that. I may earn a lot more here, but if I count all the benefits, I'd fall behind. – T

As in academia, the *Brains* in the private sector also consider additional compensations (mainly in the form of *aguinaldos* and profit sharing) as important components of Mexican wages, but perhaps more important, many revealed that the most significant factor behind highly competitive salaries in Mexico is related to the great income inequalities (and the distribution of wealth) in the country:

> What happens is that I earn more here, but I also spend more; in relative terms it's similar. What you have in Mexico is that salaries soar at Senior level positions, and here they don't grow that much from one position to another, so my friends who stayed there are Directors now, which was the pathway I had, but at that time it didn't attract my attention. Anyway, I think that in my area Mexico could pay me better, particularly because over there money has a better purchasing power. – A

As noted at the beginning of this section, the minimum wage differentials between the UK and Mexico are abysmal, but given that we are addressing the highly-skilled

workforce, this comparison could be misleading. For this reason, I considered the average wage per month for a worker in Mexico (which accounts for around £280[29]), but even this salary can be easily surpassed by privileged socioeconomic groups, such as highly-skilled workers in academia or the private sector. This is why the *Brains* are aware of their privileged status in Mexico, and the majority perceived themselves as the beneficiaries of inequalities:

> If you look at it from a selfish viewpoint, I'd live better in Mexico. I compare myself to my brother, for example, he has a very similar job to mine. He's a few years younger than me, and I could easily have a salary like his, but he lives in a flat 4 times the size of mine, has someone to clean out the house for him, he owns a car (...) the standard of living that I could have in Mexico is much better in terms of comfort and access to services, which is important, but at the same time it reflects the high income inequalities that exist in Mexico, the highly unequal distribution of wealth, because the fact that someone from the middle class has access to these services means that there are a lot of people who are willing to work for very low wages –like cleaning the house, for example. That is not very common to find here. – Chinos

> A couple of scholars in Mexico, like my husband and me, can easily buy a house in Coyoacán [a stylish colonial neighbourhood in Mexico City] and send children to private schools. Here, if it wasn't for my partner who is older than me, I could not even afford a studio. So, in practical terms, we would live a lot better in Mexico. In social terms, it's obviously a privilege to live in a place where there are not so many inequalities, as a human being that's important to me, but in practical terms you live better in Mexico. – AGG

As with *Chinos*, many *Brains* showed awareness of their privileged status in Mexico, where inequalities allowed them to earn competitive salaries, pay for services, and afford different belongings. *AGG* on the other hand, reflects on how such privileges (like buying a property) in Mexico cannot be matched by the living standards in the UK. However, she stresses how privileges in Mexico tend to be related to inequalities, whereas in the UK privileges are related to living in a more equal society.

In sum, *Part four* shows how the migration experience is not a categorical narrative of a "better" life in the UK, but "different". In *Salvador's* words:

> Like I say to my parents: you win some, you lose some. I used to think that I gained more by living in developed countries, but my perception on the quality of life has changed and now I would give it a 50-50: in some ways life is better in Mexico, and in some others in the UK.

Living conditions in the UK have many aspects that are appreciated by the *Brains*, mainly in issues like security, public services, cosmopolitanism, a meritocratic society, gender equality, or a more advanced democratic environment and an active civil

[29] Source: Mexican Institute for Competitiveness, IMCO.

society. The sharp contrasts that were mentioned by my interviewees must be taken into consideration as serious inhibiting factors to return to Mexico. However, other aspects, like living standards, show a more balanced picture between the two countries. Contrary to assumptions from economic theories (and my own initial belief), wages can be equally competitive in both countries. Three relevant factors in this balance have been overlooked by migration studies: inequalities in Mexico, additional compensations, and the Purchasing Power Parity. But perhaps more important, within these reflexivity processes between one country and the other, key factors in the development of a transnational identity, like familial and long-time friendship bonds, suggest that roots are very important for the *Brains*, and along with other conditions in Mexico (like "better" socialisation, gastronomy, or the weather), a connection that transcends physical distance is revealed.

Figure 10 shows a summary of the perceptions that were mentioned by the *Brains* as part of their migration experience regarding living conditions, socialisation, living standards and family and long-time friendships. In most of the cases, the émigrés noted contrasts between Mexico and the UK, but in others, no contrast was made (thus the blank spaces). Reflexivity, deliberation, objective and subjective views can be observed between their past and actual life:

FIGURE 11.

THE *BRAINS'* PAST AND ACTUAL LIFE IN THE UK AND MEXICO

	UK	**MEXICO**
1. Living conditions	Democracy and civil society	Political instability
	Gender equality	
	Meritocracy	Nepotism/elitism
	Cosmopolitanism	
	Culture	Culture
		Nature (beaches)
	Quality of life in smaller cities	
	Public services (health, education)	Predominantly private services (health, education)
	Public transport	Private transport (Own a car)
	Openness	Social prejudices and discrimination
	Security	Widespread insecurity, criminality and violence
	"Healthy" environment	Pollution
	Green areas	
		Poverty

	Proximity to Europe	
	Rule of Law	Corruption
	Bureaucracy	Bureaucracy
	"Bad" weather	"Good" Weather
	"Bad" food	"Good" Food
++++2. Socialisation	People are "cold"	People are "warm"
	Anonymity and privacy	Better socialisation (although "gossipy")
		A "happier" social environment
3. Family and long-time friendships	Multi-cultural families	Family & Family support
		Long-time friendship relationships
	"Home"	"Home"
4. Living standards	Good holiday periods	Shorter holiday periods
	Good Wages	Good Wages (better Purchasing Power Parity)
		Unequal income and wealth distribution
		Affordable domestic servant
	Expensive rents	Affordable properties
	Greater opportunities to travel	

After analysing what the *Brains'* life is like in the UK, a fundamental question remains, regarding the kind of ties and connections that the émigrés still have with Mexico at a distance. *Part five* addresses the issue of identity and belonging, where personal ties and views of Mexico are a preamble for analysing professional ties in chapter 6.

– Part five –

"No matter where I am, I'm still Mexican":
KEEPING TIES WITH MEXICO FROM THE UK

For Hawkins, in a globalised world, 'identity and belonging are problematised' (2016, 127). Time and distance have a definite influence in modifying the skilled migrants' identity and belonging, but as we saw in *Part four,* roots are still important for the *Brains*, and being away does mean an end to their *Mexicanhood,* nor necessarily an absence, either. Migration can separate families for long periods, but as Harzig, Hoerder and Gabaccia (2009) note, this is one of the main sources where transnational relationships develop: as with many other migratory groups in the world, Mexicans in the UK also go back and forth between both countries (with variable frequency), and find different ways to keep in touch with their relatives and long-time friends.

In *Part five*, the interest is in documenting a scarcely investigated aspect of skilled migration, namely regarding how *Mexicanhood* (identity and belonging) is shaped and performed through time and distance, which involves addressing their thoughts, feelings, and economic and social ties with Mexico. These issues follow the transnational perspective that, as argued in chapter 2 (section 2.3) reveal a need to move away from nation-states as the basis for exploring migratory pathways –where leaving was assumed as definitive, and identity was assimilated by the receiving context—, in order to allow new reflections for widening our understanding of contemporary skilled migration. These personal ties are a preamble for addressing professional ties and distant collaborative projects, in chapter 6.

4.10 A matter of identity: Being a Mexican in the UK

My first interviewee was *Mango*. Being abroad for more than 16 years made evident his elevated sense of alienation towards Mexico throughout the interview. This inspired further queries, so I could learn more about his identity and sense of belonging. One of the final questions I asked him was "What does *being Mexican* mean to you?" and he replied:

> It's a feeling that involves knowing your culture, your origins, the history of your country, to understand it and to spread it to other cultures. To know the good and bad things of that culture. To reflect on what Mexico can offer to other cultures, and what can we learn from other cultures. Advantages and disadvantages. I try to convey the good things about Mexico to foreigners, and to clarify that there are also bad things that must be considered, according to the country's development. So, it's transmitting knowledge from Mexico to other people. The rest are just clichés: Sing the national anthem? It's been a while since I last sang it. Watch football matches? I don't like football. Dancing Mexican music? I don't dance that much. Watch Mexican soap-operas? I don't like them.

As with *Mango*, the responses gathered are a mixture of emotional and rational aspects, and often '*more emotional than rational*', as *Quiquillo* replied after a few seconds of reflecting on his *Mexicanhood*. As Harzig, Hoerder and Gabaccia (2009) note, the 'negotiation' of identity takes place as a double process: on the one hand, a process of alienation to their *Mexicanhood* that is influenced by time and distance, and on the other, an acculturation process which implies a selection of specific segments of British society and culture. In general, the *Brains* perceive several advantages in this negotiated, transnational experience. The most common advantage is the possibility to transit towards a more objective point of view about Mexico, as being abroad reveals a

different standpoint to contrast their actual situation with their former one, as *Étienne* expressed: *"it helps greatly to relate and understand the world"*.

The *Brains* related how, from a distance, they have been able to avoid the intensive exposure to the Mexican media, which "clouds" their judgement on the social landscape of the country. This, to many, grants them the opportunity to look at Mexican reality from a different perspective:

> It's like looking myself in the mirror every year: if I see myself daily I don't notice the wrinkles, but as I see myself in the mirror only once a year, then yes, I do note the wrinkles. That's how I see Mexico: every time I return something has changed, sadly, a bit for worse. I still think things are going to change in Mexico, though. Hopefully we will see it. – JUANR

The metaphor stated by *JuanR* repeats the perceptions of the *Brains* as looking at Mexico at a distance in a more objective way, and reveals that such a condition is accomplished by experiencing these dual processes of alienation and belonging between Mexico and the UK. In general, my informants pointed out repetitively how difficult they found it to adapt to the UK within the first few years, but this process is generally tempered as they gather work experience, develop personal relationships and become embedded in the British social landscape. This suggests that alienation is a process that does not depends solely on the number of years abroad, but rather on the *Brains'* experience and subjectivities:

For instance, *Max* (2-5 years abroad) stated:

> I think that the more time passes, I feel more distant [about Mexico]. It may be my fault only, or may be it is because there are no conditions to feel closer. It's complicated.

…Whereas *Beto* (6-10 years abroad) said:

> I used to feel more [Mexican] before, really. But being away for several years, well somehow, whether you like it or not, you detach little by little of what happens there. As much as you want to be in touch, looking after your people and stuff, there is always a geographical barrier, so you aren't there. You fade away a little.

…Or *Salvador* (11-15 years abroad) claimed:

> As time goes by I feel a bit alien to Mexico, because I've been here for a long time now. So I feel relatively alien, and every time I return is strange because I don't know how things work anymore, because I have actually made my whole career here. So all the practical issues –taxes and so on—I know how they work in England, but not in Mexico. So I feel strange, because I know how the English world works better than the Mexican world. I left right after university and

> was totally isolated from the professional world. It used to cause me a little more conflict before, I think, because I felt a great attachment to Mexico. But as I said, I think I've been losing it gradually. I think it's natural when you live in another country. So right now I feel neutral, as it doesn't cause me much conflict or pain anymore. I had trouble when I came for my Masters and my PhD. Back then I felt between two worlds, specially because I came from a world that I'd like to assume as mine –the Mexican world— but after a while you start to realise that there aren't sufficient grounds to stand up for that world anymore. So, that used to cause me an internal conflict. Now I think it's better to live in a limbo.

As the cases of *Max*, *Beto*, and *Salvador* show, it is possible to observe notions like identity and belonging are the result of negotiated projects between attachment and alienation (Huppatz, Hawkins and Matthews 2016), or feelings and emotions, where time and space are indeed relevant but not determinant. Due to the number of years they have been in the UK, many Mexican émigrés are British citizens as well. In these cases, this negotiation was particularly clear between what they keep from their past life, and what they select from their actual one:

> For me, being Mexican is part of my essence. I know people who think of their nationality as a slip of paper. To me, being British is that: a paper. But being Mexican is part of an essence, a set of values, it's what defines you, what we generally soak up from our families. And that comes with good things and bad things, because as a Mexican you learn about solidarity, to be there for the other, but you also learn about corruption, or to bend the rules, or to do things like turning left in your car even if you're in the fast lane on the right. You don't care, you do it anyway. In the end, Mexicans feel like "I'm in charge" instead of understanding that there are a set of rules. So you learn things, both good and bad ones. But to me there are many things there that define who I am. – Lola

In the case of *Lola* (who has been abroad for 11-15 years), it is possible to observe how she establishes a distinction between positive and negative attributes of both countries, and decides which ones to assimilate. For others, preserving their identity consisted of keeping a "Mexican accent" in their English, or reproducing Mexican traditions (parties, *piñatas*, and celebrations) in the UK. Altogether, these sets of negotiations are fundamental for observing the evolution of a transnational identity.

4.11 Thinking and feeling about Mexico from the UK

Related to their *Mexicanhood*, questions about Mexico were asked in order to portray how the *Brains* think and feel about the country at a distance, in order to deepen our understanding on the extent to which transnationalism modifies their views through the migration experience, as well as to identify other patterns that may inhibit their return to the country. More than a sense of "ungratefulness", as the narrative of the brain drain often suggests, the majority of the anecdotes revealed mixed thoughts and

feelings among the *Brains* with regard of Mexico, as *Puma* suggests: *'Mexico is a great Nation that alternates a rich cultural heritage and great traditions with and a never-ending history of tragic elements'*.

The most common contrast involved feelings of nostalgia and sorrow, in one-third of the cases. Related to identity and belonging, nostalgia revealed a strong emotional attachment to Mexico that prevails at a distance. As we saw in sections 4.6 to 4.9, the vast majority of my interviewees expressed their appreciation for several aspects of their life in Mexico, mainly their relatives and long-time friends, but also to their hometown, their neighbourhood, and diverse social aspects in the country.

However, after nostalgia, sorrow was also widely manifested by my interviewees. The perception of a series of aggravated problems in Mexico is widely shared by the *Brains*, who closely relate social problems to political events. It was noteworthy that many of them recalled the Presidential elections of 2006 as an important social and political clash in Mexico, in view of a highly controversial result where the difference between the winner, Felipe Calderón (from the right-wing party) was only 0.56% of the votes against his main adversary (the left-wing Andres Manuel López Obrador). The electoral process caused a major political confrontation that ended up polarising the Mexican society. These events had an adverse impact on many of the *Brains'* views about Mexico. In *Part three* (section 4.5.2.1) we saw how *Quiquillo* was one of the émigrés who actually tried to return to Mexico with his family, but found adverse conditions for re-establishing in the country. In this part, he adds that the complex political landscape of 2006 constituted his second reason to leave:

> I also saw that the situation was going to deteriorate. It's political. In 2006, we realised that the elections would bring series of problems, and I'm not a prophet but I saw it coming: Things got very ugly. I think it was in 2007, while I was here doing a sabbatical year when we weighed the possibilities and said, "Well, we either go back or stay here forever". So we decided to stay in the UK for personal reasons, and because of the political issues in Mexico. – Quiquillo

Under Calderón's Administration (2006-2012), the government went into an armed confrontation with drug cartels across the country. This confrontation rocketed

violence throughout the Mexican territory, causing over 121,000 deaths[30] that have continued to grow in the current Administration of Enrique Peña Nieto (2012-2018). The news regarding violence spread worldwide, and drug-related violence became present in the Mexican collective imaginary. These political and social problems added to what my interviewees heard from their families and acquaintances, and had a serious impact on their thoughts and feelings about Mexico, of sorrow and remorse:

> Obviously my country hurts badly, for the things we are going through. And it's a very strange feeling, to be a part but not be part of it. Every time I get drunk I cry. I reach that mourning level because of what's happening, and not knowing what to do. Maybe people abroad don't have it clear that drugs are not being consumed in Mexico. I feel obliged to explain them what's happening. So it's a very bipolar thing, between wanting people to have a good impression of my country, and just wanting to be away from Mexico, isolated. It hurts a lot, as all other Mexicans feel. – AGG

> (…) And then the problems started in Mexico, regarding violence. It makes you wonder. There was this time when we went there on holidays, and people would tell us, "don't return for any reason!" – Tzotzil

As *Tzotzil* and *AGG* show, despite their close attachment to their families, longstanding friends and several aspects of Mexican culture, the crude reality regarding insecurity, violence and the war on drugs in Mexico are relevant inhibitors (or "push-factors") for them to return. For the émigrés –regardless of their field and sector of work— this adverse social situation not only inhibits their return, but also has affected the development of skilled labour in Mexico: *Puma* (from academia) and *Gabriel* (from the private sector) share similar views in this regard, particularly in those places where the war on drugs has caused more victims and social consequences:

> Mexico has many economic and social problems. The issue with the drug cartels trade seems to me like a real tragedy (...) In Astronomy, a distinguished Mexican scientist opened an institute in Morelia [the capital city of Michoacán, one of the most affected states by drug-related violence]; he's a friend of mine. Back in that time, Michoacán was a paradise on earth, but then came the shootings and the *Zetas* [one of the most brutal drug cartels in Mexico, created by former members of the Mexican military]. Who is going to go Michoacán now? That's a big problem for decentralisation. Astronomy in Mexico has a great tradition, and the UNAM created an institute in Baja California [Northern Mexico], and another in Morelia. Who is there now? The landscape is not encouraging, because the problem is economic, but not exclusively economic, but social and institutional. – Puma

> We need a regulatory framework that is really respected, that the system of justice (commercial or criminal) works and that there is stability, in country-risk terms: Nobody is going invest in bottlers in Michoacán if the *Zetas* will go to their business to collect a rent [many business in

[30] "Más de 121 mil muertos, el saldo de la narcoguerra de Calderón: Inegi". PROCESO. http://www.proceso.com.mx/348816/mas-de-121-mil-muertos-el-saldo-de-la-narcoguerra-de-calderon-inegi [Accessed 30th December 2016].

> Mexico are forced to pay a monthly fee to the drug cartels in order to operate]. Nobody will send their executives if they have to buy anti-kidnapping policies, and no one will develop hotels if the country's reputation is damaged. – Gabriel

The impact highlighted by *Puma* and *Gabriel* reinforces the views on how skilled labour markets need several conditions to develop that are not only related to scientific or professional aspects, but to a series of living conditions (addressed in section 4.6), which are mostly related to security and political stability. In these aspects, the UK surpasses the complex socio-political landscape in Mexico.

Through the analysis of the *Brains'* thoughts and feelings about Mexico, memories of their past lives show a series of likes, dislikes and comparisons, where transnational identity paves the way for new 'self-discoveries' on belonging, as Power (2016) called them. Such emotional patterns are closely interrelated: besides sorrow and nostalgia, other mixed feelings involved pride, guilt, and concern about their hometowns and the relatives they left behind. Within these accounts, a sense of commitment was frequently observed to do something about Mexico from the UK. I address this unsuspected commitment in the next section.

4.12 Skilled émigrés as "Ambassadors": Representing Mexico at a distance

According to Huppatz, Hawkins and Matthews (2016, 4), questions like '*Who am I, and What do I belong'* are open to multiple decisions on the side of the individuals, who must weigh not only choices, but also responsibilities. In this study, as the *Brains* reflected on their *Mexicanhood* and their paths in the UK, a sense of responsibility to represent Mexico in the UK was frequently expressed, particularly to face the stereotypes about Mexicans in the UK.

Unlike the U.S., there is not a widely extended presence of Mexican or Latino communities across the UK, but what exists is mostly concentrated in London (McIlwaine and Bunge 2016). Moreover, the UK Census and registry forms in the UK (either for a job application, or to enrol in a higher education institution) lack of a category for Latin American ethnic backgrounds, as there are for white, black, or Asian. On the one hand, the lack of 'visibility' of Latino communities in the UK is perceived as a positive condition (particularly compared to the widespread prejudice against

Mexican immigrants in the U.S.), but on the other, the absence of Mexican immigrants in the collective imaginary of British society leaves stereotyped views about Mexicans, as well as the news about criminality and violence, as their few references to the country:

> I feel very Mexican, perhaps even more than when I was in Mexico. I feel that before they [British and European people] knew me, people used to think that Mexicans wore sombreros [a Mexican hat] and had naps under a cactus in the desert. You may think that's unbelievable, but it's true! That's what many Europeans think about Mexicans. For me it's very important that people know that I'm Mexican, and to give them a good impression of my country. – AGG

The practice of their *Mexicanhood*, along with an aspiration for visibility and recognition in the UK, motivates the *Brains* to represent Mexico in some way. Since Mexicans are not embedded in the collective imaginary of British society, the *Brains* claimed that their work and personality are frequently associated to the perception that people have about Mexicans in general. For a third of my interviewees, this constitutes a "moral duty" that implies representing the country with pride and professional commitment in the different social groups they interact with (in-laws, students, peers, neighbours and so on), in order to contend the stereotypes. Continuing with *AGG's* recount:

> Professionally I feel very responsible (…) I hope that my students think a bit of me the next time they meet a Mexican, and realise that a Mexican is not someone having a nap with a *zarape* [a Mexican blanket made of wool or cotton, with an opening in the middle to place the head]. I think that other Mexicans I know, who have also remained here, are giving a good impression of the country.

As with *AGG*, the responsibility to represent Mexico in the UK reveals a highly-competitive aspect within my interviewees, who are keen to be associated with a good professional performance, and promoting the country by doing their job well. The desire for visibility and recognition entails a responsibility as a kind of "Ambassador" of Mexico in the UK. As observed in chapter 2 (section 2.5.3), this self-nomination is an important element to set the grounds for scientific diplomacy.

The *Brains* also showed an extensive commitment to contend stereotypes about Mexicans. This acquired sense of responsibility (unsuspected before the interviews were conducted) is highly-relevant, as it contends the traditional narrative around the notion of "loss" of the brain drain. Although the *Brains* experience an inevitable

alienation process, it is also noticeable that a majority shared a commitment to represent the country at a distance, not just from a nationalistic perspective, but also from a desire to become more visible and recognised professionally. These two aspects, regarding belonging –albeit negotiated— and a desire for recognition suggest an opportunity for widening their professional contacts with Mexico, as will be addressed in chapter 6. I will next analyse another component in the transnational identity of the *Brains*, regarding their communication channels and travel frequency to Mexico.

4.13 Staying in touch: communication channels and back-and-forth travelling between Mexico and the UK

As fundamental components of transnational identity, the *Brains* were found to carry out several efforts to preserve their personal relationships and ties with Mexico. Throughout the year, the émigrés dedicate time for communicating with their family and friends, and resort to technology (social networks and online platforms like Facebook, Twitter, Skype, or Whatsapp) as the most recurrent ways to nurture relationships and make physical distances shorter, as *Juan* stated: *'Many people complain that I spend too much time on Facebook, and maybe it's true, but given that I live abroad and most of my friends live in Mexico, or scattered around the world, then it's a great way to keep in touch with them'.*

As for traveling, the anecdotes revealed a dynamic mobility among my interviewees, as the majority of them (two-thirds) claimed to travel to Mexico once a year or more (Figure 12). As for their motivations, emotional attachment to the country (in the various aspects that were noted in *Part four*) is highly-relevant, as the émigrés' main reasons to travel have to do with reencountering family and long-time friends. In this aspect, the number of years that the *Brains* have spent abroad did not necessarily make a difference in their travelling frequency: the group of émigrés who have been abroad for 11-15 years appeared to travel more frequently to Mexico (twice or more per year) than the rest of the émigrés. Yet, the group who has lived abroad for the longest period (16 years or more) shows more limited travels to Mexico (only once every three years):

FIGURE 12.

TRAVEL FREQUENCY TO MEXICO/NUMBER OF YEARS ABROAD

Travel Frequency	2-5 years abroad	6-10 years abroad	11-15 years abroad	16+ years abroad	Total
Once per year	4	9	3	1	17
Twice or more per year	2		6	2	10
Once every two years		2	4	1	7
Once every three years or less				2	2

The main element that determines the *Brains'* travelling frequency to Mexico is money, often pressured by the elevated living expenses in the UK. Travelling to Mexico can be very expensive, particularly when the *Brains'* families are comprised of several members (hence more flight tickets need to be bought), or when their families in Mexico are spread across different spots in the country. As with many Mexicans, the *Brains* often claimed to have relatives living in the U.S., and to a less extent, in Europe.

4.14 A "rich" migratory group: The issue with remittances

As noted in chapter 2 (section 2.5.1), remittances are an essential component for the Mexican economy. However, the majority of households receiving remittances are in rural locations, with a high degree of marginalisation and an average educational attainment of basic education (CONAPO-BBVA 2015). By contrast, in *Part one* (section 4.1.2), we observed a privileged socioeconomic background among the skilled émigrés, comprised mostly of their highly-skilled status, languages, access to information and financial resources. In this vein, most of my interviewees (almost two-thirds) expressed that there was no need for them to send money (in the form of remittances) to Mexico to support their relatives. Only eight of them claimed to send remittances regularly for the support of their families back home.

This trend not only reinforces my initial observation about the generally elevated socioeconomic background of the *Brains*, but also portrays them as a migratory group whose main contribution to Mexico at a distance cannot rely on sending remittances (as other larger, generally unskilled migratory groups), but rather on their intellectual and professional expertise in their different fields of specialisation. With this in mind, the *Brains'* professional experience in the UK will be analysed in the next chapter.

Conclusions

From the perspective of transnationalism, this chapter addressed relevant patterns, differences, motivations and transitions behind the émigrés' decisions to leave Mexico, as well as to remain in the UK. The five parts in which this chapter is organised contributed to observing how these decisions are shaped through different lifecycles, under varying contexts.

As has been argued, transnational identity does not emerge abruptly, but is rather developed progressively along with the migration experience. Key patterns showed that the vast majority of my interviewees had already experienced mobility before leaving Mexico. Within these initial mobility experiences, early associations with knowledge are particularly relevant in the form of education, as one-third of the *Brains* left their hometowns to enrol in undergraduate academic programmes. In this endeavour, the decisions on *where* to study are relevant for two reasons. Firstly, it reveals that 'concentration' is an inherent condition of skilled migration: only four "student cities" of Mexico (Monterrey, Puebla, Guadalajara and above all, Mexico City) attracted almost all of the *Brains* to study their undergraduate degrees. The empirical evidence thus confirms that the patterns of migration are first developed on local, state or national levels, as Harzig, Hoerder and Gabaccia (2009) stressed. These cities appear as important drivers for an *internal* brain drain in the country. Secondly, the choice of a higher education institution in Mexico also showed an unforeseen contrast among my interviewees: whereas most of the *Brains* in academia enrolled in public universities, the *Brains* in the private sector enrolled primarily at private universities. More than an issue on being able to afford tuition fees, decisions were mainly influenced by the interest of public universities in research, versus an elitist component within Mexican private universities as means to access often selective work environments in the country.

From these patterns and differences, a condition of my interviewees as privileged socioeconomic groups was addressed in terms of their academic qualifications, their command of English language, the access to information on scholarships (for those who got one), and their possibilities to afford other living expenses in the UK (i.e.

flights, visa costs, housing…). However, an unforeseen element within the framing of Mexican émigrés as privileged groups relies on the relevance and implications of inequalities in the country. As noted in section 4.9, there is an extended awareness among the *Brains* about their privileged status in Mexico, and the majority perceived themselves as the beneficiaries of inequalities for different factors. Firstly, the Purchasing Power Parity (PPP, a term to make comparisons on what monies of different countries can buy), was suggested by one of my interviewees as an element I should take into consideration to compare the living standards in Mexico and the UK. In terms of the PPP, the balance favours Mexico. Secondly, even though salaries in Mexico are much lower in real terms than in the UK, additional compensations are common, in the form of advisory services, conference presentations, grants, *aguinaldos*, and by becoming members of the SNI (in the case of the *Brains* in academia) or by profit-sharing (in the case of the *Brains* in the private sector). Altogether, these inequalities, although harmful for social justice in Mexico, have relevant effects in offering competitive salaries for many of these privileged émigrés, which allows them to pay for services and afford different belongings in Mexico that cannot be matched by the living expenses and living standards in the UK. Within migration studies, living standards, PPP, and inequalities in sending countries have been overlooked in migration studies, even though they are fundamental in portraying a more balanced picture between both countries.

However, studies not only facilitated mobility within Mexico, but evidence showed that they constitute the main driver for leaving the country. Postgraduate programmes were found as the most relevant "pull" factor to the UK, in more than two-thirds of the cases (27). At the micro-level, these decisions are shaped under similar motivations: for the *Brains* in academia, mobility is associated with the practice of science and its perception as universal, where a 'scientific vocation' (or a 'calling', in *Weberian* terms), drives their intentions to explore new horizons as valuable means in their career paths. In the case of the *Brains* in the private sector, the decisions to enrol in a postgraduate programme in the UK were related to widening professional opportunities to a global scale. In both cases, the prestige and cosmopolitan character of British universities are fundamental factors behind their decisions to arrive to the UK. On the other hand,

other factors at the macro-level are also relevant. In the case of Mexico (the sending country), the Conacyt scholarship programme is fundamental for supporting studies in distant latitudes, and in the case of the UK (the receiving country) several initiatives for the promotion of the country in Mexico (mainly through the British Council, university fairs around the country, and the promotion of its culture through British schools and other events) are important means for recruiting students, who can eventually become part of the workforce, as with the case of my interviewees. In other words, soft power does seem to make a difference as for talent attraction.

The migrant perspective also showed how scholarly purposes overlap with social and personal experiences. Differences in culture, socialisation, living conditions, gastronomy, transport and public services, and even the weather contribute to the creation of new subjectivities. Identity and belonging are challenged by the receiving context, where "anchoring" factors progressively develop. By contrast to traditional connotations of "push" and "pull" factors from macro-level economistic approaches (addressed in chapter 2, section 2.2.1), I suggest the term "anchoring" to emphasise how macro-factors (such as education systems, work opportunities or skilled labour markets) are internalised by the émigrés *during* the migration experience, not *before* migration takes place. This perspective suggests an understanding of the decisions to remain under a notion of continuity, that is, a progressive experimentation at the receiving context, where clear trends are revealed. On the one hand, following the conclusion of the post-graduate programmes that brought them to the UK, many *Brains* sought to continue either to another post-graduate degree, or to work in academia or the private sector, where they progressively become members of valuable invisible colleges and communities of interest. On the other hand, life in the receiving context opens the possibility to develop personal relationships. More than half of the *Brains* were found to meet (and fall in love with) other *Brains* —as in all cases their partners of my interviewees were also highly-skilled. Along with the pursuit of further studies or work opportunities, foreign partners are fundamental "anchoring" factors influencing the *Brains'* decisions to prolong their stay in the UK. From a transnational perspective, the presence of "anchoring" factors stresses the notion of decisions as a continuum of experiences, as well as the uncertainty behind the decisions to remain,

as most of the émigrés manifested (even those who have been in the UK for more than 16 years!).

However, life in the UK is not a one-way depiction of a "better life", as the brain drain narrative often suggests, but as the vast majority of the *Brains* claimed, life is only different. Many living conditions in the UK are indeed highly-regarded, particularly on those aspects where Mexico is lacking: security and the Rule of Law were stressed as some of the most appreciated elements in their receiving context. Likewise, access to public services (transport, health or education) were associated with a more equal society, and the perception of more solid institutions and a stable political landscape enables the *Brains'* insertion into a more democratic, equal, and meritocratic political landscape, where a good number find means to participate in civil society. But these aspects are not sufficient to portray the realities of skilled migration. Constant reflexivity processes were observed among the émigrés, which involve a deliberation between their past and actual life. From these contrasts and comparisons, a more balanced picture is shaped: factors like culture, traditions, the weather, gastronomy, the facilities to socialise, and above all, family and long-time friends left behind were greatly appreciated in the everyday lives that the *Brains* left behind. These deliberations between objectivities and subjectivities are profoundly influential in shaping a transnational behaviour, where personal and emotional ties with Mexico are widely present, and enhance numerous connections. The reproduction of Mexican traditions and celebrations in the UK, frequent travels (the vast majority of the *Brains* claimed to travel to Mexico once or twice per year), and frequent calls and online communication with Mexico through social media revealed that the *Brains* carry out consistent efforts to make geographical distances shorter. This prevalence of emotional and personal ties with Mexico demonstrated that skilled émigrés are not *entirely gone.*

Reflections on Mexico at a distance showed mixed feelings towards the country, where nostalgia coexists with sorrow. Perceptions of an aggravated social and political landscape in Mexico beget widespread concerns among the *Brains*, and consequently are relevant "push" factors; criminality, insecurity, corruption, extreme politicisation or violence in Mexico not only inhibit their return, but to a greater extent, they also

inhibit the development of a labour market for the highly-skilled. From their perspective, scientific and professional activities need conditions like security and a Rule of Law to flourish. Within these perceptions, criticism and scepticism towards the government is often found in the empirical evidence, which suggests that these factors must be taken into closer consideration for the feasibility of diaspora policies and long-distance collaborative initiatives, as will be argued in chapter 6.

Transnationalism entails then, frequent processes of 'negotiation' of identity and belonging, as suggested by Huppatz, Hawkins and Matthews (2016). In this regard, elements like alienation did not appear as a resignation of the émigrés' *Mexicanhood*, or a lack of interest about the country (even less, a treason, as some views within the brain drain debate have suggested). Quite on the contrary, the negotiation processes often entailed a call for action: many *Brains* assume a 'moral duty', or an acquired sense of responsibility towards Mexico from the UK, and frequent perceptions about their roles as "Ambassadors" of their country in the UK included fostering connections, disseminating information on the realities of the country, promoting elements and traditions of Mexican culture, organising politically to pressure the government from abroad, and contending stereotypes of Mexicans within the British society. These activities show how skilled émigrés push for visibility and recognition, both of their country and of themselves. These elements (identity and belonging, attachment to their past life, and a struggle for visibility and recognition) are starting points for suggesting that closer connections with the Mexican skilled diaspora can be envisioned.

In sum, transnationalism is a pertinent theoretical framework to transcend state-bound analysis towards other global scenarios, where migration appears as uncertain, mobility is more dynamic, and migrants become transmigrants who are in many ways neither from here nor from there, travelling back-and-forth between their country of origin and their receiving country, negotiating their identity and belonging through the passage of time and distance, and making connections for a wider understanding between two otherwise distant nations, such as Mexico and the UK.

Chapter 5

Opening Pathways:

The professional experience of the *Brains* in the UK

Introduction

Chapter 4 addressed the development of a transnational identity in the Mexican émigrés in the UK. Key patterns, differences, motivations and transitions were identified to advance our understanding of the decisions they made to leave Mexico, and to remain in the UK. As has been argued, decisions are widely influenced by career-related aspects, as the vast majority of the *Brains* initially left Mexico to study a postgraduate degree, and sought to remain thereafter –either for further studies or to gather work experience. Altogether, these anecdotes portrayed studies and career choices as fundamental "pull" and "anchoring" factors to arrive or remain at the UK.

This chapter is focused on the professional experience of the Mexican *Brains* in the UK, where macro-level elements such as the asymmetries between the labour markets of Mexico and the UK, and their effects on work opportunities and professional choices constitute some of its key drivers. The empirical findings in this chapter are presented in two parts. *Part one* addresses an unavoidable topic within a bottom-up perspective of skilled migration –yet underexplored to date— on how the concept of the brain drain is perceived from the migrant's experience, or in other words, what the "drained brains" think about the brain drain. Traditional understandings about the notions of "loss" behind the brain drain narrative (the loss of the skilled individual, the loss of investment in human capital, and the loss of contact) will be contrasted with empirical evidence, in an effort to portray a contemporary understanding of skilled migration.

From this discussion, *Part two* builds on from the constructivist perspective that was explained in chapter 3, regarding how the construction of knowledge and facts is the product of human activity, interacting with diverse elements that span materials,

equipment, staff, stakeholders, and a complex set of institutions (Sismondo 2008). As has been argued, this study advocates for the visibility and recognition of the skilled Mexicans' work and achievements in the UK. For this reason, from describing some of the most significant aspects of the Brains' work, duties, and roles in the UK, the chapter draws on the main contrasts that the *Brains* perceive between Mexico and the UK regarding their scientific/professional fields. In these comparisons, the North-South (or centre-periphery) debate between Mexico and the UK is depicted through the notion of 'structural imbalances'[31]. In this chapter, the term is expanded to contrast two nations with different levels of development, such as Mexico and the UK, and analyses the relation between such asymmetries and the *Brains'* preference for the British skilled labour market, in six aspects: budgets, infrastructure and equipment; R&D and design activities; networks and communities of interest; triple helix collaborative schemes; and underlying working conditions.

In his work *Logic of discovery or psychology of research?* Kuhn famously wrote: 'We must explain why science –our surest example of sound knowledge— progresses as it does, and we must first find out how in fact it does progress' (1970, 20). This chapter is guided by the view that skilled émigrés play an essential role in this endeavour.

– Part one –

THE BRAIN DRAIN FROM THE PERSPECTIVE OF THE "DRAINED BRAINS"

5.1 Between concept and experience

Puma is one of the most eminent Mexican scientists in the UK. He arrived in 1976 to study his Master's and PhD degrees at a world-renowned university, attracted by the possibility of conducting research early in his career. After two post-doctoral stays in the U.S., he came back to the country as a lecturer, in a university located in the Northern part of the country. *'I was the only foreign lecturer back then'*, he recalls. After several years of continuous work and becoming a British citizen, he was

[31] As noted in chapter 2 (section 2.4.1), this term was initially suggested by Portes (1976) to explain, from a quantitative perspective, that elite emigration is a consequence of disparities between the supply of professionals produced by the educational system of a society, and the internal demand for their services.

appointed a Professor, and later on he was the founder and the director of a newly created research institute in his field:

> I remember it was inaugurated by the Prime Minister, Tony Blair, and as every politician, he shook hands with all the staff. The first thing he did was to count the nationalities of my team: we were thirteen different nationalities. Nowadays, I have students coming from everywhere in the world.

Puma's anecdote is useful to highlight the rapid evolution of skilled migration in the last few decades: from isolated cases like his own, to an expanded phenomenon with global implications. Since the sixties, the brain drain has been commonplace for different kinds of debates and understandings among skilled migrants. When asked if they had heard about the brain drain before, all of my interviewees replied in the affirmative, even with obvious remarks, as recalled by *UKMEX*: *'Even my mom talks to me about it'.*

In order to portray a contemporary notion of skilled migration, analysing how the concept of the brain drain is perceived by the "drained brains" is of paramount interest to this dissertation. As discussed in chapter 2 (sections 2.1 and 2.5.3), the brain drain revolves around three main notions of "loss": the loss (or no return) of the skilled individual, the loss of investment in human capital, and the loss of professional contact with their country of origin. Even though my interviewees understood the concept in different ways, these notions were frequently mentioned:

> Of course, since I was in Mexico, and I've been thinking about it too. For me, it's basically about Mexicans who, as in our case, were trained with high-level studies and found opportunities or a job abroad, and preferred to live there rather than to stay in the country. I guess an important part is that this can be seen as a problem when the country invested in the training of these Mexicans. In my case, the Conacyt invested in me, so the country apparently loses and that's negative. – Juan

As with *Juan's* comment, this negative perspective on the brain drain is widely present among my interviewees' understandings. Yet, different views are also weighed once the *Brains* internalise and contrast the brain drain concept to their own migrant experience: professionally, their skills grant them access to different kinds of opportunities in the UK but as Sontag (2016) explains, skilled émigrés are not 'free-floating individuals', but are immersed in institutional contexts. These institutional contexts are embedded within the current global dynamics of science and skilled

labour, where the conditions of the labour market for the highly-skilled in the UK have several differences compared to the conditions in Mexico. In the next section I address three aspects (opportunities, the labour market in Mexico, and the global dynamics of labour markets) in order to grasp the contemporary trends of Mexican skilled migration to the UK, with a view to identifying contrasts between the brain drain as a concept, and the "drained brains" experience.

5.1.1 A 'moral equivalence': skilled individuals and opportunities

Professional opportunities have been widely discussed as relevant "pull" factors in migration studies. In this study, their fundamental role behind the *Brains'* decisions to leave Mexico and to remain in the UK is confirmed. However, as noted in chapter 2 (section 2.4.2) Shapin's (2008) notion of a 'moral equivalence' (or the humanness of skilled individuals, who have the same expectations and desires as any other person) is reflected in the way émigrés seek and take such opportunities, which involves a deliberation between their freedom as individuals on the one hand, and an awareness on the negative implications for Mexico on the other, which begets moral concerns:

> Well, being completely honest, it might have a negative impact [his presence in the UK]: Being Mexican and highly-skilled, that is not using his knowledge and abilities to help organisations, either commercial or governmental in Mexico to improve its processes. So from that point of view may be is not harmful, but it's definitively an opportunity that is not being used – Tzotzil

> It's one of those things that as a child I thought I'd never do. How come someone dares to leave Mexico?! To start, it's not good, and then it's a little ungrateful: You go and never come back. I took the opportunity, but yes, I guess that in Mexico I could be training somebody. And that is lost – Pinky

> (...) I never thought I'd leave Mexico, but once I did I could perfectly understand why people do it. I know that in real terms it's negative, but there's no way I could be doing what I'm doing had I stayed in Mexico – Erasmus

As these accounts show, the negative implications for Mexico are weighed alongside an extended perception of opportunities as valuable means in their aspirations for professional realisation. But contrary to the narrative of a "lack of opportunities" in the brain drain literature, some of the *Brains* claimed that they had actually received work offers in Mexico, and yet they turned them down in order to remain in the UK. This suggests, as *Erasmus* pointed out in her quote, that not only opportunities are weighed, but also the quality of such opportunities. In chapter 4 (section 4.2.1) *Max*'s

case showed how the conditions in his hometown in Mexico constituted serious "push" factors, where leaving was an inevitable choice to move forward in his life and his career. In this quote, he also refers to the quality of opportunities that can be accessed abroad:

> As a person you always have opportunities, and opportunities have a level of quality that, as a professional you have the ability to identify, which of them are better or worse. You have the freedom to choose those opportunities and define your future. I think of the case of the brain drain in Mexico, and particularly in the group of the population I belong to. The quality of opportunities that exist for me are greater abroad than in Mexico. That's what I think the brain drain is. I think it's a scenario that is real, and I do think that is negative. I have friends who are in the same situation as me, who left to study a PhD and stayed in Australia, or the U.S.. Among my closest friends who grew up in Hermosillo [the capital of Sonora, a Mexican State in Northern Mexico] around 90% of them left Mexico, and they are all very well trained, holding Master's or doctorate degrees. Hermosillo's economy is very primary. The quality of opportunities is abroad, and they took those opportunities – Max

From the perspective of *Max*, the value of his knowledge and skills are decisive means for pursuing opportunities, where a 'moral equivalence' is revealed in his sense of freedom to choose the best opportunities available to him (and his friends) as a highly-skilled individual. In his reflection, he portrays the brain drain as a scenario where the quality of opportunities is abroad, which impels skilled individuals to leave Mexico. As Giddens (1991) and Beck and Gernsheim (2002) noted, elites are better suited to make lifestyle choices among different work options in modernity, wherever they are. From this perspective, the next two sections address some of the main features of the labour market for the highly-skilled in Mexico, and how such a market works in modern economies, like the UK.

5.1.2 The labour market for the highly-skilled in Mexico

The limited availability of opportunities in sending countries has been widely referred to as a fundamental "push" factor in migration studies, but the underlying conditions of skilled labour markets are rarely addressed. In this case study, a common assertion among the *Brains* regarding the labour market in Mexico points to conflicting strategies between the government's efforts to invest in training human capital, locally or abroad (mainly through the Conacyt scholarship programme) and the limited capacities of the Mexican labour market to recruit them after the conclusion of their studies, as *Pinky* notices: *'Mexico grants scholarships for its students to pursue*

doctorates abroad, but then it can't bring them back. Of course it's negative'. This ambiguity, of training individuals and not creating the conditions to recruit them, is to her, *'a stupidity'*.

Another issue related to the disparity between skills and work positions, which has been overlooked when assessing the "loss" of human capital, is related to the level of skills acquired abroad by the émigrés, which can be above the level of expertise and scientific development available in sending countries. The development of the field creates a level of specialisation in an area of research that limits the options for the *Brains* to work, which portrays a different perspective on the scope of the "loss" of human capital. The *Brains* in academia illustrate this phenomenon:

> It depends a lot on what's the need of a particular field in Mexico. I don't think it's possible to say that the brain drain is negative when there is actually no development of a certain field in Mexico. I think that these days it should be seen as normal, regardless of the country, that people seek opportunities in the field they want, wherever they find them. I don't know if that's positive, but for me it's certainly more positive than negative. – Rafa

The *Brains* frequently mentioned *Rafa's* claim about the limitations of scientific research in Mexico. With no clear articulation between training and recruiting strategies, the acquisition of new knowledge and skills abroad increase the risk that Mexico fails in attracting its grant-holders and émigrés back to boost its scientific or professional brainpower. As with *Erasmus'* case (quoted in section 5.1.1), many *Brains* expressed their belief that they would not have achieved professional success had they remained in the country, and some of them expressed fears of 'job devaluation', which entails the lack of recognition or effective use of their new academic credentials (Delgado Wise et.al. 2015), or even worse, of a 'brain waste' upon a hypothetical return to the country (Daugeliene 2007).

Finally, the empirical evidence showed that, due to the limited capacities of the Mexican labour market for the highly-skilled, there is a frequent oversupply of human capital. The *Brains* who gathered significant work experience in Mexico (previous to leaving for the UK), expressed difficulties in assessing the implications of their absence in the country:

> Professionally, I believe that there are many people in Mexico who are able to do what I do, so am I missing? I don't think so, because it's hard to find a job, and so many people are looking for

> one. If anything, by leaving I'm making room for someone else (…) At country level the brain drain is negative, because people who could be doing a benefit are lost, but if you don't have the means to do so, it may not make a difference whether you are in the country or not. – Mariana
>
> My absence is negative, yes, although there are many PhDs nowadays who can take my place. It's not as dramatic as we think. After my departure, my position was immediately taken – Quiquillo.

Through the émigrés experience, it is possible to observe that despite an effort for training more skilled individuals abroad, the shortage of skilled work positions reveal the insufficient capacities of the labour market to drive Mexico towards a knowledge-based economy. As a consequence, there are few professional incentives for skilled émigrés to return, and moreover, it is possible to suggest that other *Brains* could join them under the current conditions, particularly when these limitations coexist with the global dynamics of labour markets, which will be analysed in the next section.

5.1.3 The global dynamics of labour markets

Since 2001, Iredale observed a movement towards more international professional labour markets, which, fuelled by the internationalisation of higher education, would be decisive in the 'war' over skills. From this perspective, and having experienced first-hand the dynamics of the labour markets for the highly-skilled, for many *Brains* the notion of "drain" appears in many ways as relative, given the scope and impact of elite research centres and transnational companies on a global scale, where its effects can no longer be understood from a reductionist dichotomy between who "wins" and who "loses" skilled workforce based on nation-bound criteria. In a context of globalisation, the revenues from skilled labour often transcend national borders. Some of the *Brains* working in the private sector illustrate that transnational companies –with great financial and political power— are able to establish themselves in both developed and developing countries, with great capabilities to mobilise financial resources across borders:

> From my experience, it's not like you're working in a first world country and say "how different is my work compared to the one I had in Mexico!" Actually, in Mexico my work was more advanced. I mean, the Japanese company I was working for, was far more advanced than the British company I'm working in here. In the automotive industry, the British must be around 20 years behind the Japanese, easily (…) in that sense my work here is less developed than the work that I used to do back in Mexico – Mariana.

Mariana's anecdote shows how, even though her work was 'more advanced' in Mexico, the company she was actually working for was not Mexican, but Japanese. A similar approach can be found in scientific research, where the questions asked and interests pursued may not respond to Mexican interests, under the logic of the world systems theory and the imbalances of peripheral science:

> From my perspective as a Physicist, you can discuss a lot about what is being done academically in Mexico, and to whom it benefits. In the areas of science and computing, electronic technology, and other related fields, I think that scholars in Mexico are carrying out research which is dictated, or at least influenced by the interests of large corporations: Google, Intel, Microsoft... We are serving the interests of powerful corporations in the U.S. or Europe, which define lines of research in Physics, the fashionable ones, and ultimately producing things for purposes that are not always directly positive for Mexico. – Charantulo

Charantulo's reflection suggests that transnational companies may not only be 'dictating' research interests in Mexico, but also commercially exploiting the knowledge generated. This behaviour has been observed in science policy studies in Mexico since the 1990s, particularly since the signing of the North American Free-Trade Agreement (Schoijet 1991). From a counterfactual perspective (*what happens if the Brains return, or never leave Mexico?)*, *Mariana* and *Charantulo's* quotes suggest that the contributions, research findings, applications, or revenues obtained from work conducted in Mexico may not act primarily to the benefit of the country, but for the benefit another country, institution or corporation. From this perspective of "outsourced" skilled labour, the postulates of the world systems theory (addressed in chapter 2, section 2.5.3) seem to prevail: regardless of where knowledge is produced, or where the work is conducted, the gross benefits may still concentrate in advanced economies.

In the same vein, the inherently global condition of science and technology was widely noticed from the *Brains'* experience. For instance, *Emilio* works in developing software for monitoring warehouses at a British company, and as an engineer he believes it is *'technically impossible*' to develop technology in a single country, as it *'forces the world to mobilise its talent'*. Likewise, for the *Brains* in academia, modern science redefines traditional assumptions of the brain drain. Returning to the views from *Puma* (quoted at the beginning of *Part one*, in section 5.1) *science in the making* entails intense mobility and collaboration, even in Mexico:

> That concept [of the brain drain] no longer exists: it is a circulation of Brains, rather than a drain. And Mexico is a very good example that such flow exists. Even in Mexico there are some foreigners, such as my thesis supervisor. Now, I'm not informed on the specific details, but by reading the papers you can identify researchers with foreign names publishing at Mexican institutions. So Mexico is not exempt from this type of phenomenon, and thus I would speak about a brain circulation. Where I would make emphasis is on whether that flow is positive or negative: If the flow is negative –that is, if there are more people leaving the country rather than coming, well that must be considered. But the concept itself is anachronistic.

Puma's quote refers to 'brain circulation' as a more suitable concept to frame the current realities of skilled migration, where even developing countries can be immersed in attracting foreign brainpower to nurture their scientific power: according to Gaillard and Arvanitis (2014), in 1985 less than 30% of Mexican scientific publications had international co-authorship; by 2011, international co-authorships reached over 55% of scientific publications. However, as *Puma* acknowledges, migratory inflows and outflows may beget a problem of balance that is well-worth analysing.

In sum, the three topics addressed from the *Brains'* experience (opportunities, the labour market in Mexico, and the global dynamics of labour markets) contest in numerous ways the traditional understandings of the concept of the brain drain. First, the notion of "lack of opportunities" (often categorically assumed) was rather observed from the perspective of "quality of opportunities", that impel the *Brains* to seek better professional landscapes abroad. Second, limited capacities to recruit skilled workforce in the Mexican labour market, plus conflicting strategies between talent formation and work opportunities leave limited choices for skilled individuals within the country, where the notion of "loss" of human capital is contrasted by the unequal developments of many scientific fields, or by the skills acquired abroad, and the knowledge available in Mexico. And third, the global dynamics of labour markets point to a reflection on whether the contributions, research findings, applications, or revenues from skilled labour are indeed being perceived in receiving countries. In modernity, transnational corporations and research centres with global reach can effectively mobilise resources across borders, and the benefits may still be concentrated in developed countries. These three perspectives from the *Brains'* experience allow a contemporary portrait of skilled migration, which will be addressed next.

5.1.4 Towards a contemporary understanding of skilled migration

The *Brains'* transnational identity, and their experience as "drained brains" call for a necessary transition in our understanding of the brain drain. As noted in the previous sections (5.1.1 to 5.1.3), the phenomenon is shaped by complex factors that involve human decisions and aspirations, taken within structural conditions in labour markets and global trends. Also, where mobility is a necessary means to create and maintain the dynamism of knowledge economies:

> We wanted, or our countries wanted to do business more easily, and to do it worldwide. So that has human implications. If you want that level of trade, people must do that trade. If we are going to work together we have to travel, we have to understand each other. So there are implications. So I say it's now more natural. As time goes by and the world becomes smaller, it becomes easier to interact, and barriers are breaking. Then, it is less a "drain" and more the result of how we have led the world, of how business and trade are carried out. I'm not saying that it's fine, I'm saying it's a natural result (…) and even if I was sponsored by the Mexican government I would not look at it from a negative perspective anymore. It's part of the movement of this world. On the one hand, the government has a duty to support their fellow nationals to train in the best way possible, and on the other, each individual can and should have the best opportunity to progress. So I already see it [the brain drain] as a natural way, of how we have led the world. – Raúl

Raúl's quote is highly relevant to depict a contemporary portrait of skilled migration, where mobility is made possible by individuals making choices based on the opportunities available, and have gradually moved away from state-bound negative connotations to become a more 'natural' phenomenon, enhanced by the global implications of open markets, science, and knowledge economies. Even though the negative implications of skilled migration were constantly mentioned, and cannot be overlooked in contemporary understandings, the *Brains'* experience offer alternative ways of assessing these implications. For instance, many émigrés stressed that a level of temporality should be considered:

> On the one had it's obviously negative, because people who already have knowledge acquired are not being used in a direct benefit to our society or our national economy, but it also has a positive side, because maybe we're not working directly in our country, but may be at some point we'll return –because I think most Mexicans share that feeling of wanting to go back at some point— and all those experiences that each of us has may be used in Mexico. – Paco

Paco's perception stresses the increasingly blurry boundaries between migration and mobility, and highlights how professional experience might be used for the benefit of Mexico in the future, on what could be seen as a 'brain storage' strategy. Additionally,

the perspective of "drained brains" revealed the need to transcend categorical negative framings of skilled migration:

> I think it can even be positive, if handled well. What the Conacyt should do, or the country in general, is not to conceptualise the brain drain as a loss, and therefore not to lose sight of us. On the family side, everyone still has contacts with Mexico, but regarding work those links are commonly lost (…) Mexico could benefit by contacting those individuals and asking them for support. They could say: 'help us to evaluate projects, or to make connections to send Mexican students, sponsored by foreign agencies, not Mexican money' (…) Not just to leave them out and lose track of them, but to establish a more direct link, and exploit these links, which I think can be very valuable. – Juan

In this quote, *Juan* identifies a significant consequence of the disparity between the brain drain as concept and the experience of "drained brains": under a notion of "loss", the *Brains* become invisible abroad, and Mexico is likely to keep losing contact with these "other" Mexicans –highly-skilled, who have migrated in less numbers— as has occurred for decades. Changing the notion of "loss" is then of paramount relevance for the emergence of diaspora policies, which aim to portray skilled diasporas abroad as allies, or "Ambassadors" for co-development.

The need for visibility and recognition thus emerges as a valuable factor for change: knowing *who* these Mexicans are, *what* they do, *where* they are, and *what* are their achievements and actual/potential contributions at a distance constitute fundamental questions to be asked in order to advance towards a better understanding of the relevance of Mexican scientists and engineers in the UK, and how their experience can contribute to the contemporary debate on skilled migration in Mexico. At the same time, however, the views of these "drained brains" revealed profound differences in terms of quality, availability and relevance of opportunities between the two countries. These differences appeared to be highly influential in their decisions to remain, and were also found to be diverse and closely entangled. I address these questions in *Part two*, where the professional experience of the *Brains* reveals harsh realities and asymmetries between Mexico and the UK.

– Part two –

THE PROFESSIONAL EXPERIENCE OF THE *BRAINS*: A PORTRAY OF IMBALANCES BETWEEN MEXICO AND THE UK

As described in the Methodology and Methods (section 3.3), one of the requirements for choosing my interviewees consisted of them being employed at the time of the interview. As the organisation of the data progressed, the *Brains'* work appeared more closely related to their identity than I initially expected. For Huppatz (2016), work in late modernity is a 'common lived experience that plays a role in the production of social life, identities and experiences of belonging' (ibid., 139). In *Part two*, work is the main unit of analysis, where the *Brains'* pathways in the UK become visible. In addition, the experiences gathered indicate considerable differences between the labour markets for the highly-skilled in Mexico and the UK, which I identify as 'imbalances' for the reasons that were addressed in the introduction of this chapter. By making use of the diverse characteristics of my sample (scientists and engineers graduated in STEM fields, working in academia and the private sector, conducting research and non-research activities in numerous fields of expertise), the goal is to advance our recognition of the contributions and achievements of the Mexican skilled diaspora in the UK, to acknowledge the main imbalances of the British scientific and professional landscape with regard of Mexico, and ultimately, to draw on initial reflections on how the *Brains* engage in scientific/professional collaborations, as a preamble for chapter 6.

5.2 Towards visibility and recognition: the *Brains'* work in the UK

Even though this dissertation takes a relatively modest sample of the Mexican skilled diaspora in the UK, the vast array of working fields –both in academia and the private sector— gives a glance of their level of specialisation, and the scope of Britain's outstanding position as a knowledge economy. The research topics of the *Brains* in academia cover a wide range of fields, and in most of the cases is not limited to one topic:

Structural Design Systems Engineering Simulation Supply Chain Management Emergency Management Humanitarian Logistics Modelling And Minerals Ultrasonic Transduction Bioengineering Biomedical Engineering Sports Medicine Mechanical Engineering Materials

Physics Data Science Immunology Immunotherapy Computational Cosmology Astrophysics Computer Simulations Stem Cell Transplantation Histocompatibility Immunogenetics Material Processing Molecular Biology Neuroscience Protein Crystallography Immunology Genetics Particle Physics Infectious Diseases Tropical Medicine And Vaccine Production Biochemistry Molecular and Cell Biology Cancer Research

In the case of the *Brains* who work in the private sector, their main duties cover:

Software Testing Structure design Components testing Industrial Machinery Management Market Research Data Analysis Financial Risk Modelling Consultancy in Logistics Algorithms testing App development Brand management Mexican products Imports Technical Support Consultancy Corporate Strategic Consultancy Private Equity Technical Direction Vehicle Dynamics Business Development

With this broad range of fields and occupations among my interviewees, in the next section I will analyse their perceptions about their work, where imbalances between Mexico and the UK emerged as a fundamental component of the *Brains'* professional motivations to remain. By making use of the qualitative nature of this research, I relate such perceptions to their scientific or professional duties, as a way to show in greater detail key aspects of their career objectives.

5.3 The development of scientific/professional fields: perceptions and realities between the UK and Mexico

From the qualitative analysis of the *Brains'* perceptions about their work in the UK, as well as from the comparisons they made with regard of their scientific/professional fields in Mexico, a clear picture emerged of a series of complex imbalances that define harsh asymmetries and realities between the labour markets of both countries, both in academia and the corporate world. Altogether, these imbalances provide insight into *why skilled migration happens*, and moreover, they suggest why skilled migration is a phenomenon that is *here to stay*, not only because of policies to attract/retain *Brains*, but primarily because of the choices of the *Brains* themselves.

In the interviews, the most frequent perception among my interviewees –about why they prefer the British labour market— has to do with the level of development of their scientific and professional fields, which in general are perceived as more developed in the UK by comparison to Mexico. But what are the constituents of this perception? Even though the diversity of scientific and professional fields (noted in section 5.2) must be taken into account, for the *Brains* working in research-related

activities, the level of development of their fields in the UK is mainly perceived as the existence of world-leading research; leading international scientists; advanced ideas and techniques (and thus more quality of research); advanced facilities and infrastructure; a "triple-helix" collaboration between government, industry and academia; more available funding; a wider range of academic events, and a good environment for academic exchange and collaborations. In a similar vein, for the *Brains* working in the private sector (conducting non-research activities), the development of their fields is related to the international scale of industry; the number of companies in the country; the number and size of investments; business certainty; the experience and international status of working staff; and a strong interest in innovation. Nevertheless, it is also important to remark that some of the *Brains* claimed to have no clear idea about the conditions of their fields in Mexico, and thus could not draw on comparisons in this regard.

Even though the presence of imbalances regarding the development of professional/scientific fields between the two countries are not new in the brain drain debate, its conditions, particularities and implications are often vaguely addressed. In general, the development of each field shows considerable differences in the kinds of research and professional work that is being carried out in Mexico and the UK. These numerous developments reveal the elevated levels of specialisation that the *Brains* can achieve in the UK, which are in many ways fundamental in their career paths.

The main imbalances found in the empirical evidence are presented according to the number of times that my interviewees mentioned them, and even though some level of overlapping between them is unavoidable, each of them represents key features and implications to consider in the contemporary brain drain debate: i. Budgets, funding and investment; ii. Infrastructure and equipment; iii. Research, development and design activities; iv. Networks, communities of interest and invisible colleges; v. A triple helix collaboration; and vi. Underlying working conditions. Altogether, these imbalances confirm recent understandings of science, technology and innovation as ecosystems, where 'the health of the whole system depends on its constituent parts and, crucially, on the relationships between them' (The Royal Society 2010b, 10).

As this section will show, the Mexican scientists and engineers are rapidly exposed to these developments during their postgraduate studies, and towards the end of their degree they acquire new skills, which are frequently above the level of scientific or professional development available in Mexico. The accounts in the following sections (5.3.1 to 5.3.6) should therefore be taken as a necessary matter for concern (and a call for action), but should not be taken as cause for despair: through their accounts, the *Brains* themselves pointed out different possibilities to establish collaborations and mitigate the negative aspects of their departure. Moreover, they highlighted one relevant exception within these asymmetries, as no differences regarding the intellectual capacities with their peers who remained in the country were noted among my interviewees. This is a "balance" that, in view of its relevance, will be addressed in section 5.3.7.

Given that one of the main goals of this study is related to think of ways to build more bridges with the Mexican skilled diaspora, we need first to *make them visible*, and take a closer look into the particularities, implications, achievements, and relevance of their professional pathways in the UK. This section throws light into these fundamental aspects of their migration experience.

5.3.1. Budgets, funding and investment

The most frequent imbalance addressed by the *Brains* has to do with important differentials regarding budgets, funding, and investments in their scientific/professional fields. In academia, funding is widely mentioned as a serious component in influencing the development (and attractiveness) of their fields in the UK, and of course, as a relevant part of imbalances with regard to Mexico. According to Reid (2014) the UK has successfully developed and maintained a recent model for resource allocation to fund part of science and research:

> The budget for the nation's science and research base is held by a host department (the Department of Business, Innovation & Skills since 2009) and has been ring-fenced by successive governments against pressures from elsewhere in the host department. The size of the science and research budget is determined by the Treasury and allocated separately from the rest of the BIS budget. BIS's mission-driven funding, through the Technology Strategy Board (Innovate UK) and the National Physical Laboratory, can then be tensioned against the wider BIS agenda, along similar lines to the decisions on research funding in other government departments (...) Research

> councils, funding councils and universities then develop programmes of their own, supported by the ring-fenced budget (Reid 2014, 10).

Following Reid, without leaving aside budget pressures, political issues and 'other realities' that complicate the model, the existence of a ring-fence 'has provided confidence and stability for long-term science, at times of economic turbulence and organisational change' (ibid.). Even though such a model is relatively recent, and does not protect the absolute level of spending in UK science policy, such a model for securing priority funds for science, technology and research does not exist in Mexico. Here, despite recent efforts to increase the budgets (as shown by Tuirán and Avila 2013), there is very limited awareness of the need to implement mechanisms to protect the funds from economic turbulence, which are due mainly to plummeting oil prices. For 2017 it is expected that there will be a reduction of 6.4% for the science, technology and innovation budget in Mexico; the Conacyt will be the most affected institution, with 23.3% less budget than the previous year[32].

This recent budgetary model for the UK, and the problems with consolidating a model in Mexico, has important implications from the perspective of the *Brains* in academia. Funding stability means an important asset for science and research, as the model enables grants, long-term planning, and a wider scope and relevance for their work. I addressed earlier in the chapter the case of *Puma*, one of the most eminent scientists in his field (section 5.1). In his case, his research topic goes back billions of years, up to a tiny fraction of a second after the Big Bang. In order to investigate how and when our universe began, and how galaxies and other structures are shaped, he and his research group run algorithms through super-computer simulations. Due to the nature of his research, he needs substantial resources, both financial and human. In comparison to Mexico, he reflects:

> In professional matters there is simply no comparison. Here I have a huge support. I'm at one of the best universities in the country, and the type of work I do is what is called Big Science, which means that I require considerable resources. And here I have many resources. I do a lot of computational work, and have access to super computers which I would have never had access had I stayed in Mexico, and I have human resources, too: throughout my career I've had 35 doctoral students and around 30 post-docs… many of the best in the world. So in terms of resources there is no comparison. That's a shame, isn't it? – Puma

[32] "Será el sector empresarial el recurso para CTI". *El Financiero*, September 11th, 2016.

Puma outlines a clear view about the scale of the research he conducts, as well as the funding needed for his projects as part of Big Science. In the literature review chapter, Weinberg mentioned the five elements of Big Science (1965, *in* Shapin 2008): big funding, big instrumentation, big industry, large-scale organisational conduct, and importantly, big government as its patron. From the model for funding science and *Puma's* anecdote, a clearer picture emerges of the extent of imbalances regarding budgets, grants and the organisation of science in Mexico. Many *Brains* who have research experience in Mexico*,* such as *Erasmus,* referred to such differences as *'abysmal'*.

But the volume of budgets for scientific research not only has implications for their projects, but fundamentally for the income of scientists and their research centres in the form of grants. Half of the *Brains* in academia claimed that this is often a stressful and uncertain endeavour, as their jobs (and in many cases, their visas and therefore their stay) depend on being able to sustain funding. In chapter 4 (section 4.2.1), I addressed the case of *Víctor*, who was trained entirely in Mexico but left the country through a scholarship from the Conacyt to do a post-doc abroad in the UK, on structural biology of proteins. From then on, the access to grants played a fundamental role as "anchoring" factors to prolong his stay in the country:

> (…) being at Cambridge University made it a lot easier to seek support from other institutions. One of them was the Wellcome Trust [Based in the UK, it is the world's largest medical research charity], through a very interesting programme called International Research Fellow, which unfortunately no longer exists, but was very useful for people like me: recently graduated from a university in Latin America to study post-docs in the UK. I got that financial support for three years. It covered my salary and supplies for research (…) During that time, I was able to consolidate my own line of research, which allowed me to apply for new grants, now as co-investigator for Cancer Research UK [a world-leading charity for funding research on Cancer]. My application was approved and I received funding for another three years, from 2003 to 2006. By then (…) I had won the respect of a large group of competitive researchers (…) so Professor [name] invited me to stay with him another five years, as he got the very prestigious "Programme grant" of the Wellcome Trust (…). When that grant ran out he invited me to continue with him, but warned me to start looking for other work options, because he was already near retirement, and his research group would eventually disappear (…).

What this anecdote illustrates is how the scholars soon become embedded in the *game* of applying for grants in order to preserve (or to explore new) work opportunities. It was the prestige of *Víctor's* research group that opened the doors for him, and through his ability to sustain funding, he managed to extend his stay in the

UK until now, having reached the group in my sample with the longest number of years abroad (16+).

Altogether, budgets and funding represent first, a model for funding science that does not exist in Mexico yet, and through the perspective of the *Brains*, budgets (for research) and grants (for scientists) act as means for "anchoring" the *Brains* to the scientific environment of the country. In this regard, infrastructure and equipment are essential means to conduct scientific research, and are the second imbalance most frequently mentioned among the *Brains*.

5.3.2. Infrastructure and equipment

Puma's case in the previous section (5.3.2) was helpful to illustrate the great need from Big Science for infrastructure, but even in scientific projects of smaller dimensions, equipment and machinery are essential. According to Georghiou, Halfpenny and Flanagan:

> The progress of science in general and the competitive position of a nation's science base in particular depend on access to research equipment that is sufficiently technically advanced to enable scientists to carry out the experiments needed to keep up with the leading edge of research (2001, 303)

One of the most important assets in British scientific research power relies on its highly developed infrastructure and equipment. This, however, has not always been steady, and common assumptions of the "greatness" of scientific tradition in the UK overlook the policy perspective. According to *The Royal Society* (2010b, 10), scientific infrastructure was 'allowed to erode' during the 1980s and 1990s, until 1993, when the British government issued the first major statement on science in decades, with the white paper *Realising our Potential,* where a need to better engage business was one of its priorities (Flanagan and Keenan 1998), and almost a decade later, the Roberts Report (2002) highlighted a shortage of skills in the country, and established several measures to modernise science in the UK, including increasing the number of teachers in sciences and engineering, substantial investments in scientific infrastructure, clearer career paths to improve the attractiveness of post-doctoral research, increasing the commercial focus of R&D activities, and, of course, improving the supply of scientists and engineers. It was a strategic focus on raising the

expenditure –primarily through universities and the Research Councils in the UK– that enabled it to change the landscape for the country's research infrastructure and equipment dramatically since the late 1990s until the present day (The Royal Society 2010b).

For more than half of the *Brains* in academia, infrastructure constitutes one of the major imbalances between UK and Mexican science. The views from Latour (1987) addressed in the literature review become visible in the empirical analysis: besides individuals, artefacts, instruments, and machines are essential for the *making of science*.

Among the anecdotes of my interviewees, the main components identified in regard to infrastructure rely on the extended presence of knowledge eco-systems across the UK, characterised by state-of-the-art equipment and a permanent concern about the modernisation of instruments and facilities. Many cases show the imbalances in comparison to Mexico, like *Erasmus*, who works doing biological research and specialises in the area of immunology and vaccine development for salmonella:

> To read the samples I work with, you need a machine called a flow cytometer. In all of Mexico City there must be around five flow cytometers at research institutions; only in the floor where I work we have three. We have access to everything much easier. Here you tell people that samples for the cytometer can take up to two weeks and nobody would believe you. In Mexico we know that samples for the cytometer take two weeks because many times you have to put your name on a waiting list in order to use the cytometer (…). The difference is not only on resources, but also on infrastructure. The gap is huge.

Such imbalances in the availability of equipment (where in many cases, the equipment is obsolete) create fundamental challenges for scientific research in Mexico, but the issue of availability is not the only problem highlighted by the *Brains*. A relevant topic that is not mentioned in theoretical analyses is related to how materials for science are bought and acquired. In this regard, reagents are essential for researchers in life sciences. *AGG*, for example, works in an institute in London doing basic research on the bacteria that causes tuberculosis. According to her account, this bacteria is *'particularly challenging'*, as it lives inside our own cells, and growing cases of antibiotic-resistant strains are also emerging. One key objective for her research relies on improving our understanding of how this bacteria lives, how it feeds, and thereby to find ways to attack it more effectively, with different methods than with the current

antibiotics. *AGG's* daily work is thus *'very manual, like cooking'*, as she employs equipment and reagents intensively to test different hypotheses. In comparison to Mexico, she observes:

> (…) at the institute where I work we have more equipment for the techniques I use than in all of Mexico. And the other major difference relies on the costs of materials. Here, no taxes are paid for reagents. And if you order for a reagent today, it will arrive tomorrow, in Mexico they arrive in a month, and you might need to go to Customs office to fight for them. That would be easy to fix: remove customs for research reagents! In Mexico people have less money for research, and yet they have to pay more for the reagents, and receive them a lot later.

AGG's perception portrays the acquisition of materials as essential needs in her scientific endeavour, and reveals the issues that her peers in Mexico must face. *Erasmus* (cited above) has also experienced this problem with reagents first-hand:

> Every time I go to Mexico, I visit the lab and talk to my doctoral supervisor. Being here, I try to send them things: data, unlimited access to scientific journals, or physical reagents such as antibodies for experiments. The problem in Mexico is the customs tax: as all reagents are imported, the material costs three or four times more. So it's much cheaper that I buy them and send them over courier, and label them as gifts in order to avoid the customs. I can order a reagent and I will get it in three days; during my PhD it took three months to get my reagents in Mexico. I do the same with several colleagues who are in other institutions in the world. If they need anything it's much easier for me to send them from here – Erasmus

Erasmus and *AGG's* anecdotes show that, perhaps more important than having state-of the-art equipment, there is an articulated policy of science as a relevant endeavour in the UK, where the progress of research not only depends on equipment, but also in creating the conditions for dynamic scientific processes to take place. Availability of modern equipment and infrastructure is related to other, more simple processes for the acquisition of materials like reagents, in order to enhance the productivity of scientific research. Altogether, these issues influence the *Brains'* positive perception and attraction towards doing science in the UK.

Notwithstanding, many *Brains* recalled how the limitations in budgets or equipment generated different alternatives in Mexico. Researchers have no choice but to become creative in substituting these handicaps with other initiatives, such as looking for laboratories in other latitudes to establish academic exchange and collaborations, creating more theoretically robust academic programmes, and carrying out closer supervision processes with doctoral students. To the eyes of the *Brains*, teacher-apprentice relationships are strong in Mexico, and often give birth to relevant invisible

colleges and communities of interest, from which long-distance collaborative initiatives may be envisioned, as will be analysed in chapter 6. The next section addresses another imbalance in knowledge production between the UK and Mexico, regarding research, development and design activities.

5.3.3. Research, development and design activities

Studies of skilled migration and the brain drain in Mexico have widely discussed the insufficient investments of the country in research and development (R&D) activities (Wionczek 1983; Vance 2013). Almost as a tradition, at the beginning of every presidential Administration (which lasts for six years), the government generally commits to the scientific community about raising the investment in R&D activities. The current Administration of President Enrique Peña Nieto (2012-2018) was making good progress in this regard by increasing the government's percentage of the GDP, from 0.43 in 2012 to 0.56% in 2014, but due to economic turbulence (addressed in section 5.3.2), R&D investment lost the pace and in 2016 it decreased to 0.51% of Mexican GDP (Conacyt 2017b), one of the lowest in the OECD countries, in part due to weak commitment from Mexican industry.

The possibility to get involved in design, frontier-research, and creative projects is a serious matter for my interviewees (both in academia and the private sector), and constitutes the third most frequently mentioned topic regarding the imbalances between Mexico and the UK. This reality is evident for both the *Brains* conducting research and non-research related activities: one-third of the skilled émigrés mentioned this feature of the British professional and scientific landscape as a major "pull" factor for deciding to remain in the UK. On this point, none of my interviewees perceived Mexico as superior in any of their fields.

The *Brains* in academia highlighted the extended presence and support for basic research activities, as well as the existence of offices at universities specialised in linking research groups with industries and registering patents. However, the relevance and impact of design activities were particularly illustrated by the engineers working in the private sector, where Mexico is perceived as a 'reproducer' or a 'consumer' of technology, and not as a place for developing creative projects. *'In*

Mexico we use technology; we don't develop it (…) And I prefer to develop technology that people can adapt and implement –new algorithms, and so on— and in Mexico that is hard to find', says *Chinos*, an engineer working in a start-up company in London as a Data Scientist, which more generally is a recently created position in the world. According to the *Harvard Business Review*, the term was coined in 2008 by D.J Patil and Jeff Hammerbacher (leaders of data and analytics at LinkedIn and Facebook, respectively), who named it 'The Sexiest Job of the 21st Century'[33] due to its role in processing considerable amounts of data, which is drastically changing the way businesses and organisations make decisions (Kalyvas and Overly 2015).

Despite working in the private sector, *Chinos* conducts research-related activities by applying statistics and other mathematical techniques to study the consumption of electricity in British households. He contributes to the development of smart meters to identify patterns of energy consumption. According to him, Data Scientist positions also exist in Mexico, but at a different level:

> The only opportunities I know [in Mexico] are in the financial sector, I mean where there is data analysis and optimisation. In the financial sector it's widely used; I have friends who work on it. Wages are good, being banks and financial institutions, but all they actually do is implementing solutions that have been developed by American or European companies in general (...) in the end the task you have to do over there is repetitive: you do it once, and then you implement the same technology in other areas, but it's the same process.

Chinos not only stresses the limited opportunities in Mexico for Data Scientists, but more importantly, he highlights a major qualitative difference in his work between the UK and Mexico: the design and creation of technology.

As we noted in the previous section, these limitations are connected to other factors, like the size and scope of businesses: Mexican technology companies tend to be smaller, and do not tend to export their products, either; the scale is mostly local. The *Brains* highlight that the economic power of many enterprises in Mexican industry is based mostly on manufacturing activities, where transnational companies often dictate the rules. Three of the *Brains* working in businesses related to the auto industry (*Emilio, Mariana*, and *Juan Pablo*) allow further exploration. From different viewpoints and duties, they all coincide in this perspective:

[33] Thomas Davenport and D.J. Patil, "Data Scientist: The Sexiest Job of the 21st Century". *Harvard Business Review*. October 2012.

> For the auto industry, it's far more beneficial to open a plant in Mexico than here. Obviously the cost of labour is lower and as I said before, I think that the capability of people is the same, so it's convenient for companies to open businesses there: unfortunately, in Mexico it's only about manufacturing and not development, whilst here [in the UK] are both (…) I have worked at Nissan and Honda. Nissan is close to opening another plant in Aguascalientes [a State in Northern Mexico] and the commercial corridor in Celaya [a city in Central Mexico] is growing a lot; I think they opened a new Mazda, a new Honda, and I think there are plans to open a BMW plant in Querétaro [A State in Central Mexico]. So the auto industry is growing a lot in Mexico, at a manufacturing level; but there are no R&D areas, not that I know. – Mariana

Mariana shows the large growth of automotive plants in Mexico, located strategically in Central and Northern Mexico in view of its closeness to the U.S. The car manufacturing power in Mexico reached historic production levels in 2015 and ranked 7th worldwide, totalising 3.4 million cars produced, but also reached historic levels in exports with 2.8 million cars being sent abroad; 75% of those exports to the U.S. (AMIA Press Release 2015). Conversely, the UK car manufacturing ranked 13th worldwide, with a total production of 1.6 million cars, and 1.2 million cars exported (SMMT 2016). At first glance, the Mexican car manufacturing industry is far more powerful than the UK's, but *Juan Pablo* emphasises, again, the decisive role design plays in the auto industry:

> Mexico is one of the largest producers of cars in the world, even more than in the UK, but my interest is not production, but the design, the creation... that is where the most important difference is, because the UK and other countries like the U.S. and even South Korea are very strong in that area: they have developed this expertise, which puts them in a prominent place (…) essentially, Mexico remains as a country of manufacturing, and there is the main argument of why the brain drain happens, at least from my point of view. As someone like me who wants to become more involved in the engineering of cars, rather than in production. (…) In the UK there are very small consultancy companies in automotive engineering that make many things, so in the past two decades they have lost strength and presence as a manufacturer, but they have seized much stronger as leaders in technology and design in the form of consulting. So they concentrate on the 'know-how' of making cars, and it's one of the reasons why Motorsports are here: because this great feature of technological development, is embedded in their culture. It's evident. (…) The fact of leaving Mexico involved the opportunity to be part of that industry for me.

As *Juan Pablo* notes, the major difference relies on R&D activities between the two countries in terms of the impact of knowledge production, and to a greater extent, in the generation of wealth. According to the Society of Motor Manufacturers and Traders (SMMT 2016), the UK has thirteen R&D centres, six design centres, and more than 100 specialist brands. This way, the country employs 41,000 people in the Motorsport industry, of whom 25,000 are engineers (*Juan Pablo* is one of them). Altogether, the UK invested £2.25 billion in R&D for this field (Ibid.). By sharp contrast,

Mexico lacks a Motorsport industry (and consequently no highly-skilled personnel are employed in this area), and according to the Ministry of Economy (SE) of the country, there are currently eight engineering and design centres in the country, but no in-depth information on investments made or skilled personnel employed is available (Mexican Ministry of Economy 2016).

Through the accounts of my interviewees, the implications of the imbalances in R&D activities are shown as serious motivations behind their decisions to remain. Its role as "pull" factors can clearly be observed, as they are perceived as important means for the relevance of the *Brains*' career. In the next point we move on to the fourth imbalance, regarding the relevance of scientists and engineers' networks, communities of interest and invisible colleges.

5.3.4. Networks, communities of interest and invisible colleges

We have seen that budgets, infrastructure and instruments, and the possibility to design and create (rather than reproduce) are major imbalances between the UK and Mexico. However, throughout the accounts of the *Brains* it has been possible to observe that such imbalances are not self-generated, but *made* from human activity. Latour's (1987) story on Joao Dellacruz that was addressed in chapter 2 (section 2.2.4) showed the relevance for scientists and engineers to create or join groups to do research, exchange knowledge and ideas, get feedback or contest findings, but also stressed the role of non-scientific networks (the government, civil society organisations, charities, or the military) for providing funds. For this reason, chapter 2 (in section 2.2.4) suggested two notions from STS to expand our understanding of these networks, their logic, operability and effects: 'invisible colleges', or the working groups and informal networks established by the Mexican scientists and engineers (Crane 1972; Wagner 2008), and 'communities of interest', or the broader scientific/professional and non-scientific/professional networks that surround their activities (Latour 1987).

My empirical findings show that invisible colleges have two meanings for the *Brains* in academia. Firstly, a strong interest was manifested among my interviewees towards becoming part of competitive, well-equipped, renowned international research

groups. Working in these groups grants them access to expertise, visibility, frontier research, or high-impact publications. Secondly, the *Brains* manifested a concern for the institutional context, so the issue of the location where these research groups work is also relevant, as they represent 'authoritative sites for knowledge-construction', that enable the mobility of science (Henke and Gieryn 2008, 353). Closely related, the *Brains* also stressed the relevance of being part of communities of interest, comprised mainly of non-scientific partners who suggest areas for research, innovation needs, and funds.

In this aspect, the case of *Rafa* is particularly illustrative. He works for a research group at a world-renowned university in London, on simulating processes for the mining industry. The objective of his research is to improve "froth flotation", a process that separates some types of minerals (which are valuable for the industry) from rock matter (or gangue, with no value). To him, the relevance of this endeavour is considerable, given that *'small changes in the efficiency of this process, given its massive scale, make a great difference as for the recovery of the mineral, and it's also relevant for sustainability matters'*. When I asked what he thought about his research group, he stated:

> The work environment is very good. It's a big team, with a strong record both in academia and industry, in terms of publications and so on. It has an important status in both, and that's very important, especially in engineering: because there is research but also applied research. And I've had good colleagues (…) There's a strong collaboration between us, and with other research groups as well. I work with more than one group. This is the main one, because the funds to pay my salary come from there, but I'm also collaborating in other research group.

By being part of this invisible college, *Rafa* is able to achieve valuable objectives as a scientist: conduct basic and applied research, be part of a prestigious group, publish, carry out scientific collaborations, and get his monthly pay. Paradoxically, according to *Rafa*, the mining industry is nowadays very modest in the UK, and exploitation has been diminishing. Yet, his research group has achieved a consistent support from being embedded in communities of interest, where private corporations are keen on improving the "know-how" behind mining processes. By contrast, he explains that the Mexican mining industry is considerably larger, but there is a *'sub-exploitation'* due to the lack of support for research in his field:

> For a research project to be feasible, you need to have a company, an institution that is interested in applying research. And to me that is the main problem in Mexico, in many areas: the industry is not looking for solutions to their research problems, or are not looking for them in Mexico, because they are foreign companies that conduct research in other countries. I think that's the big problem with academia in Mexico, to be able to achieve these collaborative projects. One, because we lack businesses, and two because there isn't the interest. Modelling is an area that hasn't grown as much as it could. Why is a company interested on investing in a research project? It's because of the prestige of a research group or institution in particular. We need to build that in Mexico. We require a good record and proven research results, and this university is pretty good at it.

The absence of communities of interest for conducting specialised research in mining process in Mexico become clear in his answer, where history and results in publications, prestige and institutional contexts are essential components in *Rafa's* scientific endeavours. Altogether, these elements represent a difficult imbalance to overcome for Mexico. This, however, does not mean that there are no invisible colleges or communities of interest in scientific fields in the country. Many *Brains* recalled being trained in rich scientific environments, where their own supervisors and teachers greatly influenced their decisions to leave, in pursuit of different opportunities in their careers. According to *UKMEX*:

> I was in an excellent research group at the UNAM, in the group of [name of researcher]. He and others in the group, as well as the other research groups that were around us had a very good training, with Bachelor's degrees at UNAM, UNAM doctorates, but then they all had postdoctoral stays at various points across the U.S. and Europe, mainly. And it was a very enriching environment, unlike any other laboratory. Scientific literature was discussed very thoroughly – everything that was directly related to our work– was discussed very freely and frequently. And he and the other researchers always motivated us to go abroad and see the world of science in other places, and experience science in the best laboratories in the world. That was something we always had very clearly. They would always say: "If you're going to a laboratory in a certain area, make sure that it's the best in the world" and so I came here… which if not the best in the world, it surely is among the top three – UKMEX

UKMEX left his invisible college at UNAM (the most prestigious university for scientific research in Mexico) in order to incorporate into another with a wider scope, in the UK. This is a frequent occurrence among my interviewees: research groups in Mexico are commonly run by researchers with international experience ('returning *Brains'*) that also understand the significance of mobility for a scientific career, and therefore actively encourage their students to follow a similar experience to theirs. Following Wagner (2008) these senior scientists have become part of wider invisible colleges, and stimulate their pupils to join the network, which suggests a relevant role of the *Brains* for connecting both invisible colleges in Mexico and the UK. In chapter 2

(section 2.2.4), I discussed how Crane (1972), despite conceding that invisible colleges may be geographically separated, also stressed that the success of knowledge production was due to an agreement about the importance of scientific problems; a growing number of specialists to attack the problem; and the environment, or institutional context, influencing the way scientists behave. The relevance of invisible colleges therefore still depends greatly on their geographical location, and the broader non-scientific communities influencing the development of research areas.

For the *Brains* in the private sector, communities of interest and physical spaces are also relevant for their desires *to matter*. The previous section explained that many of the largest companies are based in the UK, particularly in a 'global city' like London (Sassen 2001), where these enterprises also tend to conduct R&D activities and creative projects (instead of manufacture). These factors create suitable conditions to create communities of interest, which act as a "pull" factor for gathering talent around them. But besides the presence of multi-national companies and the level of investments that we have observed before, these *Brains* also highlighted the relevance of invisible colleges in their fields. To my interviewees, their working groups are in general considerably larger than in Mexico, and the academic backgrounds, cosmopolitan condition, and expertise of their colleagues and other senior staff at their companies were also highlighted as relevant differentials. Altogether, these invisible colleges are perceived as valuable means to learn. *Javier*, an engineer working as an Android Developer for a cloud-based music service company in London, explains:

> (…) When I worked in the U.S., I started comparing the people whom you work with, who have experienced working in large companies and projects that are applied worldwide. It's something that in Mexico is hard to find. Where I had worked in Mexico there were loads of people like me who are learning, but the most Senior staff had less expertise than the people here. Here you find people who have made books, who have done projects that are have been everywhere around the world, who have made companies. So I think that was a factor that made me stay: The opportunity to keep learning.

From these anecdotes, the effects of cumulative processes within invisible colleges and communities of interest have shown their essential role for talent attraction and retention. Invisible colleges in the UK entail means for prestige, recognition and visibility, whereas communities of interest showed the role of other stakeholders in expanding the relevance and scope of their research/professional work, or to get

wider financial support. Cases similar to *Rafa* and *Javier's* anecdotes were commonly found among my interviewees, and suggest that a considerable number of the *Brains* have successfully become part of invisible colleges and communities of interest in the UK. Given their relevance for their careers, invisible colleges and communities of interest have relevant effects in retaining the *Brains* in the UK, but at the same time, their membership to these networks also represent an outstanding opportunity for connecting these communities with Mexican scientific and professional communities, as will be argued in chapter 6. We move on now to the fifth most relevant imbalance, regarding the triple helix collaborative model.

5.3.5. A triple helix collaboration

The previous section addressed how the presence of relevant communities of interest attracts skilled individuals. However, it is the effective interaction among these communities that shapes word-leading professional/scientific activities. As was addressed in chapter 2 (section 2.4.1), an essential interaction is that between the government, academia, and industry, as 'the key to innovation and growth in a knowledge-based economy' (Etzkowitz 2008, 1).

Contrary to popular belief, the triple helix collaboration is relatively recent in the UK, dating back to around 20 years. In 2003, the *Lambert Review* addressed the university-business collaboration as an issue of paramount relevance for the economic growth and the development of science and technology in the UK, and stated:

> The biggest challenge identified in this Review lies on the demand side. Compared with other countries, British business is not research intensive, and its record of investment in R&D in recent years has been unimpressive. UK business research is concentrated in a narrow range of industrial sectors, and in a small number of large companies (...).
>
> However, there are reasons to be optimistic. Britain's relatively strong and stable economic performance in recent years will improve the climate for business investment of all kinds. Public spending on science is increasing significantly in real terms, and the UK's science base remains strong by international standards, whether measured by the quality or the productivity of its output. The R&D tax credit provides an important new incentive for business investment.
>
> In addition, there has been a marked culture change in the UK's universities over the past decade. Most of them are actively seeking to play a broader role in the regional and national economy. The quality of their research in science and technology continues to compare well against most international benchmarks. Much more attention is being paid to governance and management issues.

> Business is changing too. Growing numbers of science-based companies are developing across the country, often clustered around a university base. New networks are being created to bring business people and academics together, often for the first time. The UK has real strengths in the creative industries, which are also learning to cooperate with university departments of all kinds.
>
> So this is a great time to be looking at the question of business-university collaboration in the UK (Lambert 2003, 1).

At present, sustained policy efforts to spark intensive collaboration schemes between business and academia have greatly contributed to the UK's predominant position as a knowledge-based economy. According to the National Centre for Universities and Business (NCUB 2017), in 2015 British universities registered more than 78,000 interactions with small and medium enterprises, and more than 24,000 deals with large businesses, with an average deal of £25,000.

The aerospace industry is a useful example to illustrate this intensive collaborative model. *Raúl* and *JuanR* are two of the *Brains* who initially left Mexico to study a Master's degree in the UK, and continued towards a doctoral programme. They both left the country 11-15 years ago, and both remained in the UK partly because of love (*JuanR* got married; *Raúl* broke-up but remained in the country) and partly because of professional motivations. Nowadays, they both work in the aerospace industry, at different cities and organisations. On the one hand, *Raúl* has, in his words, *'a peculiar position'*. He is a Lecturer at a university in London, but his duties also require him to be responsible for the business development area of his research group. Given that his group offers consultancy and training services for different aerospace companies, he is frequently visiting clients, preparing tenders, and giving training courses. Being involved both in academic and private (research and non-research) activities, *Raúl* has a comprehensive view on the close relationship between both sectors in the UK, and its impact on the development of his field:

> I recently attended to the second conference in Mexico City of my field; in the UK, the next year it will be the twentieth Conference. In the topic where I work, the space industry and the private defence industry are our major consumers in systems engineering. And you know that the private military industry in Mexico is almost non-existent, as is the space industry, where the Mexican Space Agency [AEM for its initials in Spanish] has only recently been created. Actually, they approached us recently. I was the host of the AEM when they came to visit my department. But everything is pretty tasteless. It doesn't exist really.

Raúl highlights the relevance of university-business collaboration for nurturing his field, which enables a virtuous circle: his research group is self-funded from the consultancy services they provide (and according to him, they even fund other basic research projects in his department), and at the same time are able to generate valuable research with the funds they get, and thus remain as an attractive research group for the aerospace industry. By contrast, Raúl pointed out that Mexico lacks private corporations that can fund similar research, both for academic and private interests.

JuanR, on the other hand, used to work for a big aerospace company, but he and a group of colleagues decided to open their own start-up company in Oxford, mainly due to the funding and investment opportunities they envisaged in this field, as well as to make use of the consistent government support to foster space research. Even though he does not work in academia, as a PhD he *'wears different masks'* in his company, including leading projects, preparing tenders, visiting clients, and public relations with different stakeholders to promote his company. He was then asked to explain what his company does:

> What do we do in my company? Let me think of how to say it in Spanish, because I've never done it before!! [laughs]... Let me think ... We do deployable structures that are used in satellites. What we do is we explore what is called deployable structures, which may be solar panels or antennas or masts that can be folded during launch, and when the satellite or spacecraft reaches orbit, these structures are deployed. Imagine a panel that is bent and when the satellite reaches its orbit, it can be deployed. This panel may be an antenna, or may be a thermal radiator. And it seems that there is good interest from private companies to explore this technology.

Besides the curious remark that *JuanR* struggled to explain the work of his company in his own native language (perhaps as a sign of his transnational identity), his answer unveils a complex and highly specialised activity. When asked about the differences he found with the Mexican aerospace industry, he replied:

> It's very simple: in Mexico there is no commercial space area. Space technology development in universities may exist, but certainly there isn't a commercial space sector in Mexico. I know for sure, because when I was there, about to finish my degree, I was involved in a project of space technology, the first in the country, and there weren't any other projects. Outside the UNAM, nobody had another project. Today, the Aerospace sector has grown a lot. Fourteen years ago, when I first came to the UK, there were no aerospace companies in Mexico, and four years ago I found out that there were 42 transnational companies working there, particularly in Querétaro [Central Mexico], and now I guess there must be many more. So as far as I understand, there is no commercial institution, any company that dedicates to the development of hardware in the space area.

In *JuanR's* anecdote, it is possible to observe the opposite scenario of what *Raúl* highlighted in the case of the UK. A sort of "vicious circle" in Mexico involves the absence of a private sector to fund research, hand in hand with limited research in the Mexican universities, even at the strongest ones like UNAM. Even though *JuanR's* anecdote also highlights that the Aerospace industry has been growing steadily in Mexico, a recent report of the industry in Mexico stressed that the gross part of its activities are concentrated in manufacture (79%[34]), under a heavily government-oriented institutional arrangement. For Ranga and Etzkowitz (2013, 242), under a 'statist regime' of triple helix collaboration, 'the government plays the lead role, driving academia and industry, but also limiting their capacity to initiate and develop innovative transformations'. According to these scholars, the transition to knowledge societies calls for a more balanced regime, where universities and businesses take a much more active role, and even taking the lead in joint initiatives.

As has been shown, triple helix collaborations are of paramount relevance for the development of professional/scientific fields and economic growth, where policies, long-term planning, and the active participation of academia, the government, and industry, emerge as relevant components behind influencing skilled migration from Mexico to the UK.

Finally, I will stress some of the most relevant underlying working conditions that were mentioned by the *Brains*, as the final imbalance.

5.3.6. Underlying working conditions

In chapter 4 (section 4.6) we observed how certain living conditions (such as meritocracy) provide a suitable environment for skilled individuals to pursue professional opportunities. Related to this social landscape, the imbalances observed so far develop within what I call 'underlying working conditions', or work environments that, even though they are not central in the *Brains'* anecdotes, are frequently mentioned as complementary imbalances that ought to be considered because of their implications. For Flanagan (2015), such work conditions go beyond issues of

[34] "Industria aeroespacial mexicana: Panorama 2016". *Modern Machine Shop México.* September 3rd, 2016.

remuneration and benefits, and the most relevant ones I found revolve around the issues of structure and organisation, planning, professionalism, formality, legality and regulations, transparency, clear processes for recruitment, work-life balance, fixed working hours, and generous holiday periods. Although differences should be noted according to each experience, these conditions altogether have a strong impact on their perceptions and high regard of the UK as an outstanding place to work.

For the *Brains* in academia, the structure of British science, which includes careful organisation and a culture of planning, are essential components for their endeavour, as they facilitate the possibility to establish long-term goals and commitments, enable investments and establish clear collaborative schemes (between peers, national and international labs and research centres, and within the triple helix). The problematic surrounding these elements in Mexico constitutes a serious concern among my interviewees. On this point, their views move away from the common debate about the low levels of investment in R&D activities in Mexico (as noted in section 5.3.3), and primarily focus on policy issues: the lack of long-term planning, unstable financial schemes, changing government views, and ambiguous schemes for defining research priority areas as important obstacles for science in Mexico. In this regard, *Puma's* vast expertise is crucial to illustrate the implications of these structural deficiencies:

> The obvious answer [in regard of imbalances] is more resources, but it is not only a matter of resources. In Mexico there are resources now and there have been before! Mexico has made major investments in infrastructure in my area. The problem is the lack of stability, because science is a long-term activity. The great scientific discoveries are not made in a day, and what is lacking in Mexico is stability to understand such processes. There is a telescope that cost $100 million dollars, funded partly by Mexico and the U.S.. The project was finished with a 10 year-delay. Fox [Vicente Fox, President of Mexico from 2000 to 2006] opened it and it didn't work, until now. 10 years late. That's the most important thing. With stability you can build things, but without it the rest is useless.

As with *Puma*, many *Brains* claimed that structural deficiencies of Mexican science policy have an impact on the country's role for developing scientific fields, as well as for retaining skilled individuals and attracting others from abroad. Continuing with his account:

> In Mexico everything changes continuously, so it's very difficult to plan. If a Mexican scientist wants to return to the country he/she can do it, but it will depend on whether or not there are positions available at that time, and after the first year scientists no longer know their fate. Many Heads of Department over there will say something like: 'Last year we got 10 new positions… and

> for this year, well, let me talk to the Provost, who's having a meal with the Minister, so let's see what he can get'. There are no mechanisms, no order (…) I was trained by foreigners who came to Mexico attracted by the country. Recovering that kind of magnetism would be good. How to do it? It's difficult, because everything is very centralised.

These structural deficiencies reveal insufficient incentives to return to the country, particularly when funding and planning are uncertain and there are few conditions for nurturing communities of interest in Mexico. In a similar vein, the *Brains* in the private sector emphasise the need to work in trustworthy environments, where formality and legality are equally relevant:

> (…) I feel fulfilled with the people around me, I mean, the level of honour of British people in general is very high. If someone tells you something it's 95% sure that is going to be met. Things like 'let's have a meeting tomorrow' 'I'll help you because I'm interested in your product' 'your contract will be ready by tomorrow' 'your payment comes out tomorrow'. The level of certainty that I have here is very high. And in general it's very fair. Nobody tries to take advantage of you. – Antonio

From *Antonio's* quote, the presence of regulations, organisation, and formality in the UK contribute to boost business deals, based on confidence and clear deadlines. Organisation and procedural differences also involve better recruitment processes, based on the candidates' abilities and knowledge. By contrast, the lack of such processes in Mexico has a strong impact on their perception about the level of professionalism in the country:

> In Mexico the entire thing about looking for a job relies on contacts. In Mexico, the person who will get the job is the one with the best connections and in the best moment (…) Here [in the UK] they are very concerned about the objectiveness of their recruitment decision, but in Mexico everything is about "Who do you know?" "Where did you study?" "Who gave you classes (and do I know your teacher)?" "Did I like you?" – *Lola*

Lola's anecdote is widely shared among my interviewees. The presence of recruitment processes based on elitism-related views (closely related to what was argued in chapter 4, section 4.1.3 with regard of university choices), connections, and other subjectivities reveal a serious obstacle for building meritocratic work environments. Finally, the presence of a work-life balance, fixed working hours, and generous holiday periods are widely valued among my interviewees, as means for self-fulfilment. As *Javier* notes: *'In the UK they value your time as a person. Those things don't exist in Mexico'*. Even though there are great variations according to their occupation, the perceptions about underlying working conditions are highly relevant for complementing the narrative of scientific and professional imbalances behind

migration. In general, the *Brains'* anecdotes showed a strong preference for these working conditions in the labour market of the UK, and highlighted its positive effects in their self-fulfilment. These underlying conditions transcend the usual debate on skilled migration, as they entail other factors around structural conditions of professional environments in the UK, with indirect but relevant effects on the decisions to remain.

Through sections 5.3.1 to 5.3.6, we have observed a series of imbalances that place the UK scientific and professional landscape in a much more competitive advantage with regard of Mexico. However, one of the questions that remains has to do with the perception of the *Brains* about their counterparts in Mexico; those other skilled individuals who remained in the country. The final section addresses a more balanced picture, regarding the intellectual capacities of Mexicans who remained in the country, and those who are abroad.

5.3.7. Finally, a balance: intellectual capacities of the *Brains* in Mexico and abroad

One of the areas of the brain drain debate is concerned on whether there are differences in the 'professional quality', between the *Brains* who leave and the *Brains* who remain in their home countries. For Ackers and Gill (2008) the possibility of quality differentials between each group should be addressed with caution, since productivity may be much better explained from the presence of networks than by quality *per se*. In a similar vein, Børing et. al. (2015, 823) argued that attempts to link 'high levels mobility with increased excellence is unwise'. My interviewees also concur with this perspective, as they do not perceive intellectual differences between them and their peers who remained in Mexico. Moreover, they expressed their recognition (and even admiration) for their peers:

> My doctoral supervisor marked my life in many ways. He worked abroad for over 15 years and decided to return to Mexico. Actually, he had just returned when I arrived at his laboratory, and after two years I remember I told him: "But you had a whole career abroad! Why did you return?" And I will never forget what he told me: "I returned because people like you have to be trained, so if I'm not here, who is going to do it?" And he's absolutely right, so I'm trying to do what I can to help. I don't know if I would be willing to return as he did, and I know it sounds terribly selfish, but I really don't know if I'd be willing to do that. – Erasmus

As with *Erasmus*, the vast majority of the *Brains* recalled having received a high-quality training at higher education institutions in Mexico. Some of them even claimed that their training was even more robust in Mexico than in the UK, due to factors like longer academic programmes (of at least four years for Bachelors degrees; two years for Masters; and five for doctorates in Mexico), and closer supervision processes for postgraduate students. When asked about what was the main difference then, they addressed the imbalances we observed earlier:

> I think that in Mexico we have very, very good scientists. The only difference I see is that I had the opportunity, or the privilege to be embedded in much more high-level research than others in Mexico: maybe because others didn't leave the country, or because they had no exposure to the techniques, or to the really expensive equipment I have here, or because they didn't have the same contacts. – T

As *T* notes, more than individuals, the opportunities to be part of richer scientific contexts have significant effects on the quality of the research produced. As a professor in Biomaterials, she has published a vast amount of research in biomechanics, and throughout her career she has been able to create and become member to relevant invisible colleges and communities of interest, where she has developed links with hospitals and universities in Mexico, the UK and overseas. From her experience:

> The techniques we use in Mexico are still backwards. It's medicine. We don't have that model in Mexico of doing joint research with engineers at hospitals, and we do that here. I experienced this first-hand at one of the best private hospitals in Mexico. I brought a project of an implant from that hospital. I presented it to the British, and they were surprised, because they stopped using it 10 years ago. That tells me everything, because the British already knew that the implant was troublesome for endless reasons, but in Mexico we still use it. Can you imagine the number of operations that requires a person, because the implant they are getting is not the correct one? Because we have no money, because we haven't developed the ability, because we didn't know, because we have no statistics or tests... we don't have what they have here. It's the way we do research at hospitals, and at industry in Mexico.

T's anecdote reveals how the imbalances experienced by the *Brains* have significant implications for professional or scientific practice. In this case, the lack of joint research, communities of interest, investment, and equipment has serious effects in developing world-leading medical attention. The lack of spaces for the development of capabilities is frequent in Mexico, and as *AGG* notes, *'talent becomes easily diluted'*.

On the other hand, one of the common challenges for creating more communities of interest in Mexico, with international reputations, is related to the difficulties of

learning a foreign language that prevail within the Mexican population (including skilled individuals). According to a survey carried out by Mitofsky of Mexicans over 18 years old, only 12% of the respondents claimed to speak English with proficiency levels (Consulta Mitofsky 2013). Likewise, in the English Proficiency Index 2016, Mexico was classified with a 'Low level' of English proficiency, ranking 43 out of 72 countries evaluated (Education First 2016). This is why speaking English is one of the most significant elements in addressing a counterfactual question: *why do so many people not move?*[35] One-third of the *Brains* mentioned English language as one of the main challenges to face in order to integrate successfully in invisible colleges and communities of interest in Britain:

> There is the issue of social class, which is very strong in Mexico. All the people who end up leaving are those who learnt English at school. At UNAM this is very visible, because people with all the intellectual capacity of the world can't go, simply because of the language. – AGG

As *AGG* notes, even in privileged places for conducting scientific research in Mexico (like UNAM), limitations of English language are widespread, and constitute a decisive element between those who can and cannot leave the country to gather international experience.

The interviewees' mention of an absence of intellectual differences between the Mexicans in the UK and their peers who remained in the country, reinforces the weight of the imbalances that have been noted in this chapter, which result in evident differences in scientific and professional power between the two countries, and are relevant factors influencing skilled migration.

Figure 13 shows a summary of the imbalances between the scientific/professional activities in Mexico and the UK that have been addressed in this chapter, along with some of its key perceived features and implications according to my interviewees:

[35] As suggested by Arango (2000) and revised by King (2012), counterfactual explanations contribute to build more robust approaches to explain skilled migration, particularly when social, family and cultural factors are integrated.

FIGURE 13.

PERCEPTIONS AND REALITIES: IMBALANCES BETWEEN THE *BRAINS'* SCIENTIFIC /PROFESSIONAL ACTIVITIES IN MEXICO AND THE UK

IMBALANCE	KEY FEATURES AND IMPLICATIONS	
	UK	**MEXICO**
5.3.1. Budgets, funding and investment	• Contributes to the scale of scientific research (Big Science) • Essential for the income of scientists and their research centres • Émigrés' visas are highly dependent on being able to sustain funding • A recent ring-fence strategy protects part of the scientific budget • Budgets (for research) and grants (for scientists) act as means for "anchoring" the *Brains* to the scientific environment of the country.	• Frequent reductions in science and technology budget • Significantly less investment in scientific projects
5.3.2. Infrastructure and equipment	• A strategic focus on raising expenditure (primarily through universities and the Research Councils in the UK) enabled a change in the country's research infrastructure since the 1990s • State-of-the-art equipment and a permanent concern about the modernisation of instruments and facilities • Materials for conducting research are essential means for scientific productivity (e.g. reagents)	• Limited availability of scientific equipment/labs • Frequently obsolete equipment and machinery • Materials for conducting research (e.g. reagents) are often unavailable, take longer periods to arrive to the country, and are often more expensive • Researchers have no choice but to become creative in substituting these handicaps (looking for collaborative initiatives with other research centres, fostering student and knowledge exchange, developing theoretically robust academic programmes, and carrying out closer supervision processes with postgraduate students)
5.3.3. Research, development and design activities	• Extensive R&D activities are a major qualitative difference by comparison to Mexico • Enables the possibility to get involved in design, frontier-research, and creative projects • A deep interest in developing know-how • Offices at universities specialised in registering patents • R&D activities as means for the generation of wealth	• An extended perception of Mexico as a 'reproducer' or a 'consumer' of technology, and not as a place for developing creative projects • A minor involvement of industry in supporting R&D activities • Mexican corporations tend to be smaller, and do not tend to export their products, either; the scale is mostly local • The economic model of Mexican industry is largely based on manufacturing activities
5.3.4. Networks, communities of interest and invisible colleges	*In academia:* • Competitive, well-equipped, renowned international research groups • Renowned research groups grants them access to expertise, visibility, frontier research, or high-impact publications (invisible colleges) • Geography matters: the UK as an authoritative site for knowledge-	• Limited scientific/professional eco-systems (communities of interest) • A frequent *'sub-exploitation'* of research fields due to the lack of support • There are also valuable invisible colleges and communities of interest in some fields in Mexico

	construction • Extended presence of communities of interest: comprised mainly of non-scientific partners who suggest areas for research, innovation needs, and funds *In the private sector:* • Working groups are large and diverse • Relevant academic backgrounds, cosmopolitan condition, and expertise of colleagues and other staff (invisible colleges)	
5.3.5. A triple helix collaboration	• Sustained policy efforts to spark intensive collaboration schemes between business and academia have greatly contributed to the UK's predominant position as a knowledge-based economy • University-business collaborations are essential means for nurturing scientific fields • A "virtuous circle": research groups are funded from research/consultancy services they provide, quality research is generated, businesses can innovate, achieve competitive advantages and foster economic growth at a larger scale	• A "vicious circle": limited presence of stakeholders and collaborative schemes, lower impact and quality of research, lower innovation and commercialisation • A 'statist regime' of triple helix collaborations, where government may inhibit innovative transformations
5.3.6. Underlying working conditions	• Work environments and conditions that go beyond issues of remuneration. Includes: better organisation, planning, professionalism, formality, legality and regulations, transparency, work-life balance, fixed working hours, and generous holiday periods • Important effects on job satisfaction and self-fulfilment • More transparent recruitment processes and meritocratic career progress	• An extended lack of long-term planning, unstable financial schemes, changing government views, and ambiguous schemes for defining research priority areas • Structural deficiencies of Mexican science policy have an impact on the country's role for developing scientific fields, as well as for retaining skilled individuals and attracting others from abroad. • Weak compliance with regulations and deadlines affects trustworthiness and certainty • Recruitment processes/career progress based on connections and other subjectivities

Finally, despite the existence of such imbalances and its implications for the development of scientific/professional fields, it is important to note that not every field in the UK was perceived as more developed. Albeit rare, some of the *Brains* claimed that their field was actually more developed in Mexico, and they also stressed how such development may be related to a sense of survival (instead of policy planning), during critical episodes that have marked Mexico's history. For *Thelonious*,

the development of Structural Engineering in the country is embedded in the earthquake of 1985 that devastated Mexico City:

> Well, there are structural engineers everywhere in the world. In Mexico there are many, very good ones (...) Since the earthquake, and being a seismic zone, the building codes and regulations for constructions are very good, perhaps one of the best in the world. Now, its effective application on the buildings, that they are really supervised under those codes and regulations, is a different matter.

Thelonious stressed how his field, albeit developed, is challenged by the existence of building regulations on the one hand, and the realities in regard to their effective application on the other, where corruption and a lack of application of law possibly ends up in many companies not following the building regulations and codes. The living conditions that we observed in chapter 4 (section 4.6) regarding the rule of Law are visible here. Likewise, in risk management, another émigré (who just picked *A* as her nickname) claimed that the financial collapses that Mexico has suffered throughout the last decades boosted the development of financial risk analysis and management in the country:

> Given that Mexico has experienced more economic crisis, it has much more knowledge about risk than the one they had here. Risk management in Mexico began many years ago; here you have a much more stable economy, and no in-depth knowledge was needed because of such stability. Speaking about mathematical models and so on, Mexico was far more advanced than here. After the European economic crisis there is now more awareness on risk, but even still I think Mexico is ahead. – A

Importantly, for both of these *Brains*, the fact that their fields are highly-developed in Mexico informs their understanding that their absence does not have an impact in the country: *'I don't think there is a loss of talent, or something. There are very capable people in Mexico in my field'*, *A* concludes.

Conclusions

This chapter explored skilled migration from its scientific and professional perspective, where the *Brains'* anecdotes have shown some of the most relevant aspects of their professional experience in the UK. Fundamental questions for this study, regarding their occupations, duties and responsibilities, some of their achievements, and their perceptions of their fields in comparison to Mexico were addressed in this part.

The transnational perspective, addressed in chapter 4, was a valuable preamble for analysing how the brain drain as a concept was perceived by my interviewees' experience as "drained brains", where key elements were identified. Within the narrative of much of the earlier studies of the brain drain, three main notions of "loss" have been observed: the loss (or no return) of skilled individuals, the loss of investment in human capital by sending countries, and the loss of connections with their countries of origin. This narrative entails a clear negative connotation of the mobility of individuals. Along with the anecdotes presented, it was possible to observe an extended awareness among the *Brains* of the negative implications of their departure. At the same time, however, they outlined a series of reasons that contribute to our understanding of why such phenomenon happens in countries like Mexico, for the benefit of countries like the UK. Firstly, professional opportunities appear as fundamental means for talent attraction, which in this case, started from postgraduate studies at British universities (as noted in chapter 4). In this regard, however, there is an important issue that has been overlooked in migration studies: within the decisions to remain, skilled émigrés not only consider work opportunities, but also ponder the quality of such opportunities. From the *Brains'* perception, the quality of opportunities in the UK is greater than in Mexico, and from this angle, the notion of 'moral equivalence' that has been addressed before (chapter 2 section 2.4.2, and chapter 4, section 4.3.1) is, again, a useful analytical tool to understand my interviewees' deliberations between the quality of such opportunities, and importantly, their freedom as individuals to take those opportunities, wherever they are.

On the other hand, choices to remain are greatly influenced by the capacities of labour markets for the highly-skilled in Mexico and the UK, following Sontag's (2016) remarks on how, despite dynamic mobility processes, transmigrants are not 'free-floating individuals', but their movements are linked to institutional contexts. In the case of Mexico, the *Brains* frequently pointed-out the prevalence of conflicting strategies, where the government's efforts to train human capital –mainly by the hand of Conacyt's extensive scholarship programme for postgraduate studies in Mexico and abroad— is not equally complemented by an effort to create work opportunities to

recruit a skilled workforce following the conclusion of their studies. Consequently, the *Brains* are left with limited chances to apply their knowledge in productive fields. Large numbers of newly trained engineers, as Mexico is able to educate, and not enough work opportunities suggest an oversupply of human capital. As Portes noted (1976) skilled migration is one of the few alternatives; the other is to commit to activities different to their training, with a brain waste as a potential result. Finally, the experience of the "drained brains" allowed observation of important features of the global dynamics of labour markets. Within these realities, even the availability of work opportunities in Mexico should be taken with a level of care, as transnational corporations or research centres with global reach can "outsource" part of their activities in countries with cheaper labour, and still concentrate the gross of the benefits. The notion of a world-systems theory, which emphasises an uneven distribution of labour and wealth, seems to prevail in modernity.

In sum, the anecdotes of the *Brains* in *Part one* suggest that contemporary skilled migration should be seen as the 'natural result' (in the words used by a good number them) of how the world is organised nowadays. Elements like quality of opportunities (and the freedom to take them), and the institutional contexts in Mexico and the UK should not leave aside negative implications, but the traditional notions of loss in much of the brain drain narrative are contested through the lens of the *Brains'* experience, where some alternatives for countering the negative effects of their departure rely on their initiative to contribute to Mexico at a distance, as will be argued in chapter 6.

Having addressed their understanding as "drained brains", *Part Two* focused on the *Brains'* professional pathways in the UK, where their experience, levels of skills and specialisation in several scientific/professional fields are fundamental to reflect on their role in a knowledge-driven economy, such as the British. The accounts revealed major disparities between the labour markets of the UK and Mexico, with relevant implications for the perception of Britain as an outstanding place to work, and importantly, for the differences between the development of their fields. Influenced by Portes' (1976) assertions, I framed such disparities as 'imbalances', as a way to illustrate the levels of concentration, and even unfair asymmetries in knowledge

production under the 'never-ending' North-South debate regarding the brain drain (Gaillard, Gaillard and Krishna 2015).

Although some level of overlap between the categories was unavoidable, six main imbalances emerged from the *Brains'* accounts, each one with relevant features and implications. The most frequently mentioned imbalance among my interviewees consisted on the availability and scale of *budgets, funding and investment* in scientific research (section 5.3.1). Overall, this imbalance reveals an understanding of science as an important endeavour for economic growth in the UK: even though the frequent discussion of how much a country spends on R&D as a percentage of its GDP appears as highly relevant in Mexico and Latin American countries (Mercado and Casas 2015), a recent ring-fencing strategy with part of the UK's scientific budget appears as innovative means to reinforce its science policy with more stability and long-term scope, in times of political and economic turbulence (Reid 2014). In addition, the levels of investment are far greater in the UK, partly because of an extended interest in innovation and carrying out world-leading research. For the *Brains,* the vast array of funding sources has implications not only for their projects, but also for their income and the sustainability of their research centres. Even though the fierce competition for resources is often troublesome for the *Brains* in academia (as their positions, working visas, and consequently their stay depend on being able to sustain funding), the levels of resources available constitute important incentives (or "anchoring" factors) for skilled individuals to remain.

The second imbalance is related to *infrastructure and equipment* (section 5.3.2). Besides obvious contrasts of state-of-the-art scientific infrastructure in the UK (and the extended presence of Big Science projects) versus less modern infrastructures in Mexico, the *Brains'* anecdotes stressed the conditions under which science operates. In this regard, modern equipment is connected to other simpler processes, like a quick supply of instruments for nurturing research productivity. To the eyes of the *Brains*, such links between modern equipment and mechanisms for scientific productivity are substantially less common in Mexico, and researchers are often left with no choice but to create several alternatives to substitute these handicaps.

The third imbalance addressed the possibilities for carrying out *R&D, development, and design activities* (section 5.3.3). These disparities are particularly significant, as none of my interviewees pointed-out that Mexico was superior in any of these activities. As observed in the cases of researchers and workers in mining, automotive, motorsport, or aerospace industries, the labour market in the UK is largely based on developing the *know-how*, with manufacturing occupying a secondary role in the British economy. The Mexican reality is the opposite. As the *Brains* show, R&D, design and other creative activities are a central part of their professional interests, and to a broader extent, these activities are conceived as valuable means for the generation of wealth in the UK.

The fourth imbalance is related to the relevance of *networks, communities of interest and invisible colleges* (section 5.3.4). Guided by the STS constructivist perspective, it was possible to illustrate how these scientific/professional networks operate. In academia, invisible colleges take the shape of competitive, well-equipped, and international research groups, with relevant implications for publications and international visibility. In the private sector, they were mainly characterised by working staff with relevant academic backgrounds, international expertise, and a cosmopolitan component. Communities of interest, on the other hand, have significant effects on the quality and scope of the knowledge produced, but due to their connected character, these communities show that skilled émigrés (including their research groups and working staff) depend greatly on other non-scientific stakeholders to agree on research projects, funding sources, equipment, and other means that are relevant in their scientific duties. For the *Brains* in the private sector, communities of interest point to the UK as the place where the largest companies are based, particularly in London as one of the 'global cities' (Sassen 2001). It is in the UK where these enterprises conduct R&D activities, creative projects, and business arrangements. Because of their interconnected character, a "membership" of these communities was found as highly-relevant incentives for the *Brains*, as in many cases these communities had direct effects on further work opportunities, career progress and mobility.

The fifth imbalance refers to the presence of a *triple helix collaboration* (section 5.3.5), which further illustrated the way the government, businesses and universities interact. As was argued, sustained policy efforts have had profound effects in bringing together business-university relationships in the UK for at least two decades, contributing to the country's predominant position as a knowledge-based economy. As the case of the Aerospace industry showed, university-business collaborations are essential means for enabling a virtuous circle, where research groups gather funds, create quality research, and can apply their findings. At the same time, businesses can innovate, achieve competitive advantages and foster economic growth at a larger scale.

The final imbalance is related to the *underlying working conditions* (5.3.6), or working environments that primarily rely on the social/legal landscape in Britain, and enables important issues related to organisation, long-term planning, professionalism, formality, regulations, transparency, work-life balance, or holiday periods that are important for the professional fulfilment job satisfaction of the *Brains*.

Altogether, these imbalances suggest a direct relationship to the "quality" of opportunities that was stressed by the *Brains*, who take in close consideration such developments as important components of their decisions to remain in the UK. As was shown, the perceptions of imbalances reveals harsh realities to consider within contemporary skilled migration, and point to considerable challenges for countries like Mexico to cope with this level of asymmetries. From the *Brains'* experience, these imbalances can be understood as valuable "pull" and "anchoring" factors in the decisions to remain in the UK, and so any eventual decision to return to Mexico would be discouraging for many, as it would imply quitting their "membership", or their access to development of scientific/professional fields, infrastructures, budgets, equipment, networks, R&D and creative activities, and triple-helix collaborative schemes. In the introductory chapter I mentioned that one of the main arguments about the brain drain debate is relatively simple, based on the understanding that highly-skilled individuals DO make a difference in a country's welfare and economic development. This chapter demonstrated that, despite their value, skilled émigrés are highly dependent on a series of conditions for them to effectively contribute to knowledge production, economic development, and social welfare.

Notwithstanding, it is the view of this study that imbalances should not be taken as a matter of despair. This chapter shed light on the *Brains'* professional pathways in the UK. The implications of these pathways revealed relevant work positions, duties, and achievements that could be effectively used for the benefit of Mexico, and some anecdotes even suggested that, to some extent, many *Brains* may be more 'valuable' abroad, in view of their access to privileged invisible colleges and communities of interest. In addition, the *Brains* did not perceive themselves as intellectually superior to their peers who decided to remain in Mexico. Many of these "local" *Brains* in Mexico are also embedded in relevant scientific/professional networks, and are actively looking to extend such networks with their peers abroad. From this perspective, building bridges with these skilled émigrés at a distance may constitute important alternatives for mitigating the negative effects of their departure. Chapter 6 explores these alternatives.

Chapter 6

Building bridges:

Collaboration at a distance, scientific diplomacy and the challenges for diaspora policies

Introduction

The transnational perspective, addressed in chapter 4, showed how my interviewees perform and reflect on their identity and belonging (or *Mexicanhood*) in the UK. As they keep close connections (mainly emotional and familial) with their country of origin, it was argued that these scientists and engineers are not *entirely gone* despite time and distance, and in general there is a prevailing interest in Mexican affairs. On the other hand, chapter 5 explored the scientific/professional side of skilled migration, where the perceptions of the émigrés pointed to important imbalances (and harsh realities) between both countries regarding their fields. At the same time, their pathways also revealed a significant professional experience (including work positions, duties, achievements), as well as a "membership" of valuable invisible colleges and communities of interest that could be redirected for the benefit of Mexico.

Chapter 6 builds on from these findings, and explores collaboration at a distance as an alternative to mitigate the negative effects of skilled migration by building bridges with the Mexican émigrés. The chapter is divided in two parts. *Part one* addresses the bridges built already, and analyses the experience of the *Brains* who are (or have been) engaged in long-distance collaborative initiatives with Mexico from the UK. As will be shown, actual (or past) collaborations cover diverse research and non-research activities, and even social entrepreneurship and political activism. These collaborations will be discussed in terms of their regularity, temporality, and potential effects in Mexico. On the other hand, *Part two* addresses the policy perspective of long-distance

collaboration, with particular focus on the Mexican Talent Network (MTN) in the UK, the Mexican "diaspora option". Besides continuing with the anecdotes and perceptions of the *Brains*, the views of the four *Officials* interviewed from the Conacyt, IME and the MTN (introduced in chapter 3, section 3.4) are also included, in order to establish contrasts and common views on the strengths and shortcomings of the performance of the MTN-UK. The analysis is complemented with the notion of 'scientific diplomacy' (discussed in chapter 2, section 2.5.3), a relatively recent term within STS and international scientific community that aims to foster closer international relationships and scientific collaboration, through both informal (people-to-people) and formal (governmental) relationship-building mechanisms.

Finally, some ideas and policy recommendations arising from the research are outlined in order to foster or improve long-distance collaborations, and consequently, to create better conditions to face the challenges of contemporary skilled migration in future years.

So far, we have advanced understanding a group of Mexican émigrés of whom we know very little about to date. An effort has been made to approach their pathways, choices and preferences with a sense of realism. Chapter 6 argues that, for different personal and professional reasons, it is time for policy-makers to concede that many of the *Brains* may not return to the country, and consequently, it is important to reflect on the bridges that can be built with Mexican skilled émigrés as a central part of the scientific and development agendas in Mexico. Collaboration at a distance is suggested in this chapter as one of the most plausible alternatives.

– Part one –

THE BRIDGES BUILT ALREADY:

PAST AND CURRENT LONG-DISTANCE COLLABORATIVE INITIATIVES

As chapter 5 demonstrated, the *Brains* interviewed have gathered significant professional experience in the UK, in a vast array of work positions and fields of knowledge. Through their accounts, it was possible to observe how their "membership" in communities of interest and invisible colleges has allowed them to open professional paths and move forward in their careers in the UK.

This, however, does not mean that they have forgotten about Mexico. The empirical evidence shows that more than half of the *Brains* claimed to have (or had in the past) some kind of collaboration with Mexico from the UK. This is one of the main findings of this study, as it builds on from the contemporary focus on skilled migration that was addressed in chapter 5 (section 5.1.4), based on transnationalism to portray skilled migration as a more 'natural' phenomenon in modernity, that has undeniable negative implications, but at the same time, may also have relevant potential benefits for Mexico. It also shows how, through the lens of scientific diplomacy, many of these scientists and engineers have effectively become "Ambassadors" to bring two relatively distant nations closer. From the empirical evidence, a different narrative can thus be suggested.

The main collaborations are presented in order of commonality: teacher apprentice, peer-similar, capacity building, virtual collaborations, businesses, and social entrepreneurship and political activism. From discussing these collaborations and their potential effects, the goal is to stress the relevance of understanding the experience of the *Brains,* whose personal initiative and *Mexicanhood* is fundamental for establishing collaborative projects from the UK. Their visibility and recognition is then of paramount relevance for the contemporary debate on skilled migration and the brain drain in Mexico.

6.1. Teacher-apprentice collaborations

As an inherent condition of science, researchers are commonly immersed in collaborations. Following Thagard's approach to collaborations (1997), teacher-apprentice (professor-student) is a common collaboration scheme for conducting research in academia. Many émigrés maintained contact with their supervisors and teachers after leaving Mexico, eventually establishing long-term relationships and joint projects. In time, these *Brains* assumed the role of teachers, after their expertise and belonging to communities of interest in the UK. From then on, they have been able to arrange mostly temporary visiting student schemes from Mexican research centres to their labs and facilities.

Numerous possibilities are explored given their transnational condition and links with both countries. *Salvador*, for example, is a Structural Engineer who is doing research on new construction materials that can contribute to the sustainability of buildings in the future. As a native from Mexico, he was keen on exploring different materials from his country:

> Broadly speaking, what I do is structural design. Design of bridges, buildings, masts, load limits... It's what I do. And right now I'm investigating structural bamboo. That's where the links with Mexico come from, because the country produces a lot of bamboo, and it's a resource that is not exploited. And it's not exploited partly because these Northern hemisphere countries don't have bamboo and therefore are not interested. So what we're trying to do is to ask: "What new materials are in the Southern hemisphere that may contribute to structural engineering?" So my area of research is more related to countries in the south than to the north, actually.

To a greater extent, *Salvador's* illustrates the relevance of his origins, to suggest new research possibilities within his group, in order to explore bamboo as a potential material for architecture and engineering. In this case, *Salvador* got a grant from the UK Engineering and Physical Sciences Research Council (EPSRC) to conduct his research, and was able to recruit a student from Mexico to work on studying bamboo. From then on, he is looking to collaborations with UNAM to widen collaborations and work in joint projects towards a feasible option to use as a construction material. As with *Salvador*, other *Brains* are working in similar ways, by getting grants that are later used for recruiting students, with a natural focus towards Mexican students as first options.

Teacher-apprentice collaborations show how the links established by the *Brains* during their undergraduate studies in Mexico are highly valuable as means for future collaborations, where the once student-*Brains* become the teachers later. The career progress accomplished by the émigrés act as "gate-openers", where they are able to establish collaborations, recruit visiting students, and provide British or European funding to train students and nurture further collaborations.

6.2 Peer-similar collaborations

A quarter of the *Brains* in academia claimed that they are/or have been involved in peer-similar collaborations with their Mexican counterparts. These collaborations include a wide range of activities, but the most common ones consist of training

workshops, joint research and publications, assessment of research projects, internationalisation of Mexican associations and colleges, and in a couple of cases, equipment and materials donations.

In this regard, *Erasmus'* work on biological research and vaccine development for salmonella was referred in chapter 5 (section 5.3.2). One of the projects of her research group involves a collaboration with researchers from a public health institution in Mexico:

> We split the work. They started working on trying to isolate different proteins from the bacteria. They are all Chemists, so they take the salmonella, split it into pieces and try to separate each protein independently. We became interested in them because we were getting results with one of those proteins, but we couldn't purify it in those levels. We weren't that worried though, because we found out that they were doing it more efficiently. That's why we contacted them. The collaboration consists of them producing the protein for us, and we do the experiments on mice here, which would be very expensive in Mexico, because of the costs of mice and materials (...) We have had four publications between the two laboratories so far, as partners, and we have also had two visiting students from their lab to do part of their theses. What is very attractive to them is that they can send us their students, which is something they wanted to do from the beginning. There are techniques that they learn here and then they can return to apply them at their lab. They are not charged anything: it's a scientific partnership. Mexico pays for their expenses, but don't have to pay any bench fee, because universities used to set one for each overseas student. But they don't pay.

Erasmus' quote illustrates a valuable peer-similar collaboration, based on each research group's interests and possibilities. Peer-similar collaboration, in this case, includes training students in techniques and skills that would otherwise be out of reach to the research group of Mexico. Besides the relevance of the *Brains* for advancing the internationalisation of research centres in Mexico (a growing phenomenon, according to many of my interviewees), a fundamental contribution is the role of the *Brains'* "membership" in invisible colleges and communities of interest in the UK, to make collaborations possible and attractive for both research groups in Mexico and the UK. In this case, *Erasmus* acts as a "gate-opener" for collaborations of mutual benefit, that besides training, have effects on publishing joint research:

> When we started working with the people of Mexico, my boss decided to do it because I told him I knew that group. So I told him, "There's the people of Mexico" and he said: "If you think it's okay, then we will get involved".

Teacher-apprentice and peer-similar are the most common type of collaborations established (so far) by the *Brains* from the UK. As we saw, these collaborations have important implications for generating new scientific cadres, exchanging knowledge, or

conducting joint research. Altogether, these initiatives have important effects in the internationalisation of research centres in Mexico. Next, I address capacity building, another kind of collaboration with relevant lasting effects.

6.3 Capacity building

A quarter of the *Brains* in academia in my sample claimed to be/or have been involved in capacity-building collaborations. Even though person-to-person collaborations (addressed in the previous sections 6.1 and 6.2) are also valuable means for capacity building, the collaborations in this section are characterised by a wider institutional involvement, with relevant impact and long-lasting effects from central (UK) to peripheral countries (Mexico). Capacity building also shows the effects of 'diplomacy for science', a dimension within scientific diplomacy that requires more complex collaborative schemes, institutions, and researchers around specific scientific goals, needs or policies.

Within this group, the most significant and high-impact cases were found with senior academics: three of the four researchers interviewed with the level of Professor (*AR, T,* and *Alejandro*) were found to be involved in highly-relevant collaborations for capacity building in Mexico. This evidence agrees with Andújar, Cañibano and Fernández' (2015) findings, on the fact that long duration of stays abroad do not necessarily affect levels of collaboration with the émigrés' home countries.

The first case is *AR* (11-15 years abroad). He works in the development of vaccines at a world-renowned university, testing new techniques on neglected tropical diseases (NTDs)[36]. He started establishing collaborations with Mexico in 2008 (he was not a Professor back then), when he suggested to the principal investigator of his institute to do research with vaccine development on Latin American diseases:

[36] 'Neglected tropical diseases is a term first coined by scientists and the WHO, referring to group of diseases that are endemic to tropical regions of Asia, Africa and the Americas. The term "neglect" is used to describe the research trend after decolonisation, which reflects the reduced scientific research and medical mobilisation against these diseases. This decrease can be linked to many causes, however two that stand in front are socio-economic instabilities or limitations in disease endemic regions and supposed economic restraints due to low market potential' ("Challenging Neglect" [STS PhD Students blog]. URL: https://challengingneglect.com/ntds-explained/ Accessed September 19th 2016).

> I proposed three diseases: Malaria from Mexico, which is different from Africa's: if a vaccine for Africa is developed, it will not serve Mexico or Latin America or Asia, and vice versa. I also suggested Dengue, a disease that is prevalent in Mexico, Latin America and Asia. And the other is a parasite that causes a disease called Chagas (...) Fortunately I got a Fellowship from the Wellcome Trust, which is an organisation that grants very significant support. I got a fellowship for 5 years to develop a vaccine for Malaria in Latin America (...) Later on I got money for Dengue, and the director of the institute left those lines of research to me. Vaccines are of high interest to Latin America, and being Mexican myself, it was just natural.

As *AR* explains, his Mexican origins were fundamental to give shape to vaccine development for NTDs in Latin America. Once he was able to get grants for his research, he could recruit one PhD student and one post-doctoral researcher from Mexico (one working on Malaria, the other on Dengue), and four from Brazil. During this time, *AR's* links with British communities of interest grew progressively:

> One of the benefits from the Fellowship of the Wellcome Trust was the access to places and activities that I didn't know, and by becoming the principal investigator and director of graduate studies of my institute, I was able to meet other academics and people. I noticed there was a programme to bring students from China, and I proposed, "why not have one for Mexico?" My university wanted to have more presence in Mexico, and create a programme for student visits in the summer. There was a competition: twelve applications, from which we took four Bachelor and Master's students, and the scholarships were funded here.

After a series of successful initiatives with Mexico, making progress in vaccine development, recruiting students (two Mexicans among them, sponsored by British funds), and making links with different higher education institutions and research centres from both countries, *AR's* university encouraged him to upgrade the collaborations towards wider institutional levels and longer-term objectives:

> Due to this previously non-existent contact between Latin America and my university, they saw me as an opportunity, so they are supporting me to create a research centre there. I'm working on that project with a friend who also studied in the UK. He's Mexican, director of a school of Medicine in Mexico. We are creating this centre together. So my Department wants to be part of this. (...) Although Brazil is also pushing hard, we will do it with Mexico initially. Professionally, even though I'm not living there, I've found ways to open the doors for people like me, who wanted to come here. And now, I've also found ways to create an area of research where I can develop my own projects, coming and going to Mexico, may be one or two months per year. So professionally, I'm creating an infrastructure there that allows me to visit –take my family to Mexico, conduct research projects, and get funds from Europe (...) The idea is to open a space for researchers from [university name], who are interested in scientific issues that are related to Mexico. We'll start with my project as the core, but I will open the space for researchers to undertake other studies (…) we aim to provide a physical space, and legal instruments so that they can do their research. I think about the near future, where the centre can even be closely linked to the business school of the [university of Mexico]. Initially, the money will be put by the [name of his department], which is where my institute is. It's the largest department at my university, and one of the largest in Europe. They actively support the idea that we as researchers look for money in Europe or Mexico.

AR's quote shows how, from the perspective of scientific diplomacy, postgraduate students from British universities who have returned to Mexico can also become valuable "Ambassadors", in order to link both countries in joint collaborative projects at different levels. In this case, the Mexican origins of *AR* and his colleague, as well as their "membership" of invisible colleges and communities of interest, are decisive to establish this centre in Mexico, and not in another Latin American country. The relevance of vaccine development opens an opportunity for new awareness on the relevance of tackling NTDs, and therefore, to move forward in creating valuable conditions for improving the health of marginalised populations in Mexico and Latin America. To date, and thanks to this initiative, *AR* has been able to get grants from many different sources: the British and Mexican Governments, the Wellcome Trust, or his university, among others. This has allowed *AR* to create the foundations for fixed, longer-term collaborations between research centres and higher education institutions, as well as connecting communities of interest in both countries. This way, it is possible to observe how new findings in the global North can indeed benefit the global South more directly.

T is the second professor with valuable collaborations with Mexico despite time and distance (16+ years abroad). Different from *AR*, her most important collaboration is not linked to her research directly (*T's* research is addressed in sections 4.5.1 and 5.3.7). Six years ago, she started a pilot programme for student fellowships between her university and the Conacyt:

> We created the Latin American programme (…) in an effort to bring over Mexican students with limited resources. That was the goal. We started the programme on a five-year projection, with thirteen students from the school of [name of school in Mexico], who arrived at one of the institutes here. Back then the Conacyt was very reluctant, because there were no collaboration agreements between them and any British university. What we had was very little: there were some agreements but with a handicap for the Conacyt, because nobody knew them at that time, so we created the programme with the idea of helping people, giving them opportunity to come. The pilot was successful: the thirteen students that began in 2009 graduated, and this year we have 178 people (…) It started as a Mexican programme, but given its success, Chile and Brazil contacted me and I introduced the programme to them. So far we have maintained the focus, on giving priority to students from public schools, with limited resources.

T's anecdote reveals the contribution of Mexican émigrés to the rapid growth of collaborative agreements between higher education Institutions in Mexico and the UK, from inexistent collaboration agreements in 2009, to 24 in 2016 (Conacyt 2017c). Her

anecdote also offers a view on the growing significance of the Latin American programme she directs, in terms of social impact (support for students with limited resources), coverage (from having 13 Mexican students in the pilot programme, to 178 in 2015) and extension (as the programme now covers Mexico, Brazil and Chile). Training programmes are opening opportunities for new students from less privileged socioeconomic status that can benefit both countries: the UK secures a significant income from these 178 tuition fees (and many of them may choose to remain and boost the British brainpower), and these Latin American countries (Mexico included) can train their students in top research centres, with *T's* help.

The third professor is *Alejandro* (16+ years abroad), an eminent scientist in the field of stem cell transplantation, with different roles. According to him, as a researcher he has trained more than 15 PhD students from Mexico, and has received around 100 visiting students from different Latin American countries. He is also involved in management activities, by directing a research institute in his field, where he has been able to conduct frontier-research, create professional links and other collaborative activities with Mexican and European researchers and physicians:

> (…) I'm linked to high rank colleagues of the medical community in Mexico. I often travel to give lectures, and interact with people at hospitals. I helped to create transplant programmes in Mexico and donor registries, and I have also sent all sorts of things to Mexico: Equipment, grants, funds, training workshops.

Given his high-rank status, *Alejandro* has been able to transfer knowledge and technology to the country by contributing in the creation of programmes and initiatives to fight cancer. Besides, he is also a senior staff member of his university, were he seeks to liaise with British and Mexican policy-makers, government officials and funders towards the establishment of fixed collaboration schemes to the benefit of his university in the UK (by attracting funds) and Mexican institutions (by granting them access to relevant communities of interest in his field):

> We just visited Mexico with the staff of my university, not only to foster student exchange but to open new pathways of collaboration between research and higher education institutions (...). That's a goal I have: to establish communication and bridges with other institutions; not only where I can contribute directly, but also where I can contribute as a mediator, as a facilitator between British and Mexican institutions.

The three accounts of senior Mexican academics in the UK (despite his eminent position, *Puma's* case is not included, as his collaborative projects with Mexico are rather modest) reveal frequently overlooked aspects in dependency theories and North-South relations (chapter 2, sections 2.2.2 and 2.2.3), which tend to frame skilled migration as a zero-sum game under a sense of determinism, where only the negative aspects of migration are highlighted. Through the *Brains* accounts, however, these often-categorical perspectives are contested by relevant examples, such as the development of joint research projects, academic programmes, student visiting schemes, institutional agreements, and even the creation of physical spaces that contribute significantly to the development of the South (in this case, Mexico). Notions addressed before, like transnationalism (which emphasises that despite identity negotiations, origins are still highly relevant for building bridges) and scientific diplomacy are then elements that should be taken into closer consideration in contemporary skilled migration, as they may also act to the benefit of Mexico. As this section showed, the *Brains'* accounts draw on different alternatives, by using the capabilities in the North to build capacities in the South, with them as essential agents (or "Ambassadors") for change. In the next section, the discussion moves on, from 'physical' to 'virtual' spaces for collaborative initiatives, a kind of collaboration of growing number and relevance in recent times.

6.4 Virtual collaborations

The expansion of ICTs has been framed as a new opportunity to engage more easily with a country's diaspora. One quarter of my interviewees claimed to be (or have been) involved in virtual collaborations, in different ways.

The *Brains* in academia are more commonly focused on mentoring and assessment activities remotely, which include online lecturing, scientific advice, peer-reviews, and student supervision. Despite the temporality and flexibility of most of these collaborations, recent initiatives are contributing to a growing formalisation of arrangements. One of them in Mexico is the National System of Researchers (SNI), where expatriates can, since 2011, apply to become members from abroad. Even though they do not receive a fellowship, by becoming members the *Brains* can

eventually have access to grants in case they decide to return to Mexico. This has favoured an increasing participation of the *Brains* in providing feedback on research proposals, scholarship applications, articles, and scientific results from students and researchers in Mexico, where the Conacyt has approached the *Brains'* expertise as a valuable input:

> I'm a member of SNI [National Researchers System] "level I". It doesn't benefit me at all, really, as I'm abroad, unless I want to return to Mexico. But the main reason for me was that I could contribute in some way. (...) In Mexico there are loads of interesting things happening, but you certainly recognise the level of work that is being done there, regarding the development of ideas, techniques (...). That's what I try to accomplish when evaluating papers. If I spot a great difference in the quality of work, I normally try to give feedback in a positive way, not just saying, "Your work is poor" but rather by emphasising "how can you make it better". And it's the same motivation that I have now: not only assess conference papers from here, but to go there [to Mexico], and present the work we are doing, and try to achieve closer collaborations. – Juan

Despite the distance, *Juan* is able to provide feedback on different issues that Conacyt asks him through the SNI. Virtual collaborations, such as this one, can contribute to some extent to boost the development of scientific fields.

In a similar vein, remote-lecturing activities are also becoming common grounds for the *Brains* in academia. Most of them are occasional, and originate through the links forged with their peers during their undergraduate studies. However, the internationalisation of some higher education institutions in Mexico, and a more flexible scholarship scheme by the Conacyt, are also contributing to the creation of more formal, fixed collaborations at a distance. Chapter 4 addressed the case of *Cris* (section 4.4.1) who got her discharge letter from the Conacyt by agreeing an online course with her university in Mexico, which eventually took the form of a position as a visiting lecturer:

> To me it's going very well, because the course is precisely about students beginning a project of scientific research, so what I'm doing is to give feedback to students about their projects: how to write them, what structure they can give their theses, etc. I've already done three terms. (...) In the professional sense, I like to think that right now, even if it's modest, I'm contributing to widen their views about what is scientific research in general: not only on how it's done in Mexico, but at least I can give them some insight about what I've seen and what I've learned here, or about the groups that I've worked with. I like to think that's the impact I'm having.

For *Cris*, her contribution is small but significant as a way to transfer knowledge to undergraduate students through virtual collaborations. Of all my interviewees, *Cris* was the only émigré who has been able to formalise a long-distance collaboration

through the Conacyt scholarship scheme. Notwithstanding, this case illustrates how changes in regulations (both in government and higher education) can effectively promote more formal, systematic collaborations.

Within the private sector (particularly in the case of *Brains* conducting non-research activities), virtual collaborations are also taking place. For the engineers working in ICTs, remote collaborative schemes were even highlighted as part of a daily routine, with tools like teleconference or videoconference meetings, central repositories (coded servers which may not be physically installed in the companies' facilities), virtual collaborative tools to share and edit documents and data in real time, programming codes, or sending emails, among others. Yet, of the four *Brains* who work in ICTs, only *Javier* has actual collaborations with Mexico from the UK. Albeit being part of the group with less time abroad (2-5 years), *Javier* has already worked in different parts of the world, where he has experienced the intensive interconnectedness of IT companies. He recently partnered with a colleague he has in Mexico to open a start-up company, where he applies the skills he acquired abroad and exploits the possibilities of ICTs:

> We opened a company that provides Wi-Fi. Our clients can, through the Wi-Fi, generate a lot of data about their business, and can monetise it: How many people have been connected, for how long, what's their gender, how old they are, and so on. So you know if they bought coffee, and can give you a voucher to buy another, for example. There are many analytic statistics we estimate, and are part of the reports. We opened that company almost 6 months ago. (...) The project started because my friend identified the need and already had a customer. The client wanted everything ready, so what I did was to find out who had done something similar that could be adapted to what we needed. So I made a partnership with some guys in Australia who had a part of what we needed, so we didn't have to do it again. We made a contract, and they gave us their part of the job. We have arranged Skype meetings and we have a collaborative tool where we can monitor and perform changes in real time. My friend is in Mexico and I have a monitoring system; it's a tool that tells me if everything's ok, and a reporting system that feeds me information on how things are going overnight. I don't even know where the Australians are installed, but I do know what they are doing.

As *Javier* shows, IT companies rely strongly on remote working schemes and communication. He acknowledges not knowing the exact location of the Australian company, yet he is embedded in a commercial partnership for supplying a highly-specialised service (such as Wi-Fi data analyses) to a Mexican client, from the UK. This way, *Javier's* anecdote reveals an extended perception among the *Brains* working in ICTs: a great deal of trust is required within remote interactions and transactions in his

field. When I manifested my scepticism about the issue of trust, *Rius* (one of the engineers who works in ICTs but does not have any professional links with Mexico) mentioned online-shopping as an example: *'You don't know where the shop is actually located, or from where exactly your clothes are sent to your place. You don't have to go to the shop in order to give them your money. It's the same'*.

Finally, it is important to mention that a few *Brains* (three) claimed to be involved in dissemination activities through blogs and other online resources. This way, they are continuously transferring knowledge and discussing their topics of interest with invisible colleges, through virtual spaces. Even though the addressee is not necessarily a Mexican peer, knowledge is still translated into Spanish, and disseminated through the Internet.

In recent times, ICTs have become tools of growing relevance for teaching, mentoring, knowledge transfer, and scientific dissemination activities in academia. Within these collaborations, knowledge and technologies available in the UK can, again, be transferred or used to favour scientific and commercial development in different areas of Mexico, which may grow in relevance as more *Brains* join in similar initiatives. Altogether, virtual collaborations are contributing, to some extent, to increase the connections, innovation, and quality standards of Mexican scientific/professional activities, and may mitigate the imbalances addressed in chapter 5.

In the next section, I address other relevant commercial, non-research activities, where the *Brains'* act as business entrepreneurs.

6.5 Doing business with Mexico from the UK

By comparison to their peers in academia, the *Brains* in the private sector who conduct non-research activities were found to carry on less collaborative initiatives with Mexico: only a third (five) declared having/or having had some kind of collaborative initiatives during their time in the UK. These collaborations include consultancy, specialised services, and in three cases, opening of start-up companies and small enterprises. Whereas the first two activities were commercially paid between

corporate agreements, opening companies involve entrepreneurship, a stability to remain in the UK, and a transnational perspective.

In these cases, the *Brains* were found as gate-openers to the commercial landscape in the UK for Mexican producers (in a sort of diplomacy applied to non-researchers), where they provide their expertise for the import of Mexican products, by identifying the best ways for distributing the products and finding potential buyers and clients in the UK. Given their migratory status (which grants them a fixed stay in the UK), expertise, and knowledge of regulations in both countries, these *Brains* are well-positioned for establishing commercial relationships in the UK with Mexican products, and thus opening pathways for unexplored business possibilities.

Even though these collaborations were not frequent among my interviewees, two cases deserve particular attention: *Mango* and *Antonio* opened their own small companies in the UK, offering Mexican food and drinks to restaurants and stores in the UK. By making use of their Mexican origins, as well as of their contacts with Mexican producers and British businessmen/women, they are looking to exploit the growing popularity of Mexican/Tex-Mex food in the UK. As of April 2015, over a third of Britons claimed having visited a Mexican or a Tex-Mex restaurant, 'making it the fourth most popular ethnic food, behind Indian, Chinese and Thai takeaways' according to *The Guardian*, based on data from the advisory firm CBRE[37].

Albeit with a different business strategy, both *Mango* and *Antonio* have approached Mexican small-medium size companies that have an interest in exporting their products to the UK:

> I'm a platform to tell them, "What product you have? What products you sell? What do you want to do? I'll help you to test your product here, to look who you can sell it to, to check your packaging, to assist you at a legal level". What I seek is long-term relationships, and to be the owner of the rights and marketing of the brand over a period of five years. – Antonio

With this strategy, *Antonio* is looking to connect Mexican companies with big-brand restaurants and smaller international street-food establishments, as well as to strengthen commercial networks of Mexican importers in the UK. This requires him to carry out several trips to Mexico per year, attending and supporting the creation of

[37] Burritos with everything as Britain falls for Mexican food". *The Guardian.* 28th of April 2015

Mexican Fairs in the UK, and constant videoconference meetings with clients. As gate-openers, this is a difficult endeavour, as *Mango* stated:

> These days, British companies are turning around to see Mexico as an area of opportunity, but the impression I have is that in Mexico companies want to do something, but they don't know where to start. And that's what may be hindering collaboration (…) Besides, Mexican businessmen look too much to the U.S. and not to Europe, so the collaboration levels are lower. It's tough to develop business together or exploit business opportunities in the UK. I experienced that first-hand, when I wanted to bring in some Mexican products. The producer told me he wanted to export and I did the selling, I started to place orders but in the last minute the producer preferred to send his products to the U.S. and not here, so I had to cancel everything. It's a culture, let's say it's irresponsible what prevails in Mexico. That leads me to think twice to collaborate to avoid these problems. Businessmen prefer easy things without taking risk and responsibilities.

In this anecdote, *Mango* illustrates the heavily American-oriented business culture in Mexico, a legacy of history (the U.S. is the largest commercial partner with Mexico, concentrating around 80% of Mexican exports, whereas the UK only represents around 1% of Mexico's trade), and a generally weak business assessment by the Mexican government for international exports to small-medium companies. Yet, the accounts of the *Brains* reveal commercial opportunities (like the British affinity for Mexican/Tex-Mex food) that have not been fully explored in Mexico, and that could offer an interesting possibility for a larger commercial exchange between the two countries, with the *Brains* as relevant business ambassadors. Like the Mexican immigrants in the U.S. have done for decades, they could also enhance the growth of what Hirai (2009) called 'nostalgia and/or ethnical products' in the UK, which refer to the products (in this case, food and drinks) that are part of the Mexican culture, and could therefore attract the interest of the Mexican community in the UK, but also their 'ethnical' component makes them attractive to other groups of the population.

But not only can the *Brains* become agents for academic transfer or commercial activity, but also for social and political development. I will address a vaguely studied long-distance collaborative initiative to date, regarding social entrepreneurship and political activism, which have important implications for diaspora policies.

6.6 Social entrepreneurship and political activism

The last of the most relevant collaborations found is related to social and political activities. As part of a transnational identity, Harzig, Hoerder and Gabaccia (2009)

mention that émigrés often reflect on different possibilities for improving their societies of birth. Even though the main interest of this research is focused on scientific and professional collaborations, the widespread perception among the *Brains* of an aggravated social and political situation in Mexico (addressed in chapter 4, section 4.11) is worth noticing, particularly in view that it has motivated many of them to take action. As we noted, the *Brains* enjoy academic environments and a more advanced democratic landscape to engage in discussions and debates in the UK. Social entrepreneurship and activism are frequent elements of civil society in Britain.

Given the focus on scientists and engineers, their research topics rarely cover social fields, but the case of *Étienne* –an engineer who works at the development unit of his university— is different. As a lecturer in environmental studies, he participates both in academic and practice modules, where his students regularly visit communities in Mexico and Latin America and become involved in developing transformative pathways to local problems, mainly regarding water, sanitation and planning. Throughout time, *Étienne* has gathered considerable expertise in liaising with civil society organisations and academic institutions aiming towards the development of social entrepreneurship projects. To him, politics are frequently a central component of environmental issues in developing countries:

> (…) now I'm working on a project that has to do with an environmental crisis in the [name omitted] river in the Western part of Mexico, where communities on the banks of the river are in a truly dramatic situation that is getting worse. Not only they are dying from the pollution of the water, but also because they are mobilising and the state has an eye on them, so they are suffering repression. This year I intend to work a lot on that topic. In fact I'm going there in three weeks, and I'll stay for a month. I will make a film on this topic, with those who have been affected.

Étienne reveals how local problems in Mexico are also related to demands for political action in the communities. As a result, the development of transformative pathways implies a consideration of both issues: environmental issues on the one hand, and the political context on the other. Given that in his projects, social change is usually fostered through the involvement of the community, *Étienne* found a motivation to become involved in activism for the empowerment of marginalised groups and for raising awareness of the political situation in Mexico, through research and documenting the events that are later on disseminated when he goes back to the UK.

But *Étienne's* case is certainly not the only one. One-fifth of the *Brains* expressed that their concerns about the social situation in Mexico have also motivated them to take part in political activism activities in the UK, by making use of the democratic landscape in the UK:

> The maturity of this society in democratic terms allows a discussion about what we want, what we don't like, and it's very good, very stimulating as citizen. I like that. I'm a relatively political being, I like political participation, and that's what I like about London, that one can talk and discuss about how to build a society. That's a point that reveals that there is a political maturity in this country, in general. (...) When I see that there are problems in Mexico, especially of a political nature, because I'm interested in that topic, I'd like to be there, actively struggling, debating and contributing. – Raúl

As with *Raúl*, many *Brains* claimed that 'global cities' like London not only provide a unique environment for science or business, as Sassen (2001) mentions, but also are relevant means for discussing political views and raise awareness on political issues in other latitudes. As of 2015, there were at least six Mexican-oriented political activist groups in the UK, focused on issues regarding human rights, democracy, violence, the role of the media, and corruption. According to the *Brains* (and my own experience), the activities of these groups are flexible, and develop according to the political events in Mexico. In the year of Mexico in the UK/UK in Mexico, in 2015, many social issues were vaguely addressed by the governments, and it was the pressure of political activist groups (in which five of the *Brains* declared to have participated) what placed these issues on the agenda, namely, through several social and political events across the UK (particularly in London) and by taking their demands to the British Parliament, with the support of some MPs through Early Day Motions[38], as well as a discussion on human rights and disappearances in Mexico, on the 27th of February of 2015, at Portcullis House in the Houses of Parliament.

The cases of the political activist-*Brains* agree with studies that emphasise skilled transmigrants' ability to undermine the authority of nation-states beyond their frontiers, particularly since these émigrés tend to come from privileged socio-economic groups (Weeks and Weeks 2013), and therefore may represent a threat to national government's interests, given their propensity towards politicisation and

[38] *Early day motion 902*. "Carmen Aristegui and Journalism in Mexico" [https://www.parliament.uk/edm/2014-15/902]; *Early day motion 469*. "Missing Students in Guerrero, Mexico" [http://www.parliament.uk/edm/2014-15/469]; *Early day motion 831*. "Human Rights Abuses in Mexico" [https://www.parliament.uk/edm/2014-15/831].

criticism from abroad. By enjoying more democratic environments, and being regularly informed and concerned about the social and political situation in Mexico, some of the *Brains* have taken direct action on social entrepreneurship and political activism.

The contributions of the skilled émigrés in political affairs at a distance are frequently overlooked in Mexico, but perhaps more important, the widespread scepticism (and even activism) of the *Brains* towards the Mexican government must be taken into close consideration for assessing the feasibility of state-led initiatives, such as the MTN, where trust, joint interests and mutual understanding appear as fundamental elements for their success.

In sum, existing/past collaborative distant initiatives involve a vast array of projects, modalities and outcomes. Altogether, the *Brains'* experience revealed several contributions from abroad with important effects on several scientific, professional and commercial fields in Mexico. To a greater extent, the paths of the émigrés show that long-distance collaborative initiatives can offer alternatives for a more dynamic relationship between the North-South, where their knowledge, expertise and access to communities of interest can be redirected in favour of Mexico. Existing/past collaborative initiatives suggest that using a contemporary framing of the brain drain, which involves a transnational perspective, a consideration of the *Brains'* choices and decisions to remain, the advantages of scientific diplomacy and the émigrés' access to communities of interest and invisible colleges, are contributing to "convert", to some extent, the imbalances in the favour of Mexico. Altogether, these collaborations are mitigating the negative aspects of the *Brains'* departure, and consequently, are also contributing to achieve a more balanced scientific/professional exchange between Mexico and the UK.

With this in mind, the final part of this study addresses the policy perspective of long-distance collaborations, with a focus on the MTN as the main effort for establishing connections and collaborations with the Mexican diaspora.

– Part two –

Does the Mexican Talent Network work?

The policy perspective and the challenges

for tackling long-distance collaborative initiatives

In the previous section, the visibility of the *Brains'* pathways in the UK contributed to acknowledging, for the first time, the scope and effects of long-distance collaborative initiatives of this migratory group in the UK. However, it was noteworthy that most of these collaborations are either fragmented, temporary, and depended almost entirely on the émigrés' initiative. Given that the main research question of this dissertation relies on understanding *what is the relevance of understanding Mexican scientists and engineers for the contemporary debate on skilled migration in Mexico*, the policy perspective becomes relevant in order to connect the *Brains'* experience with broader science policy discussions. Specifically, to investigate on the reasons behind the modest participation of the Mexican government in these collaborative initiatives, as well as to suggest, from the empirical evidence, different ways to improve the number, scope and effects of collaborations in future years.

This part is prospective, with particular emphasis on the Mexican Talent Network (MTN) as probably the most important joint effort between the Mexican government and the skilled diaspora towards building bridges of a more systematic communication, by establishing connections and collaborations at a distance. In this part, in addition to the anecdotes of the *Brains*, the views from the four *Officials*[39] interviewed will be included to establish contrasts and common views:

5. Enrique Cabrero – Director General of the Mexican Science and Technology Council (Conacyt)
6. Dolores Sánchez – Deputy Director of Postgraduate Studies and Scholarships at Conacyt
7. Francisco de la Torre – Executive Director of the Institute for Mexicans Abroad (IME)

[39] As noted in chapter 3, the views from the *Officials'* views are not meant to be "official claims", nor as "government's plans" either.

8. Cynthia Vega – President of the Mexican Talent Network, UK branch (MTN-UK)

Through the lens of the *Officials* and the *Brains*, the emphasis is placed on analysing the main challenges for establishing long-distance collaborations, and to relate these challenges to the MTN's key elements, advantages and shortcomings.

6.7 The Mexican Talent Network in the UK

As addressed in the introductory chapter, the MTN was opened in 2005, with the following objectives:

- To promote highly-skilled Mexican emigrants to contribute to strengthen the development and technological innovation of our country.
- To promote ties between Mexico and highly-skilled émigrés.
- To promote Mexico's inclusion in the global knowledge-based economy, through the creation of synergies between its local talent and its counterparts around the world.
- To facilitate the generation of projects of high-added value in the areas of business development, education for global innovation, and to support Mexican communities abroad.
- To promote a better understanding of the contributions of the Mexicans abroad for the prosperity of Mexico and their receiving countries.
- To promote the prestige (or in my own terms, 'soft power') of Mexico abroad (IME-FUMEC 2007).

In Mexico, the MTN is run by the IME, an agency that is part of the Ministry of Foreign Affairs of Mexico (SRE). The IME provides institutional support for the operation of the different MTN branches worldwide (called "chapters"), but the management of these chapters is carried out by the skilled émigrés autonomously. For Francisco de la Torre, the IME only acts *'as an institutional facilitator'* of the MTN.

The UK chapter of the MTN was launched in 2010, following the initiative of the TEC of Monterrey's alumni association. Among the founders was Cynthia Vega, the current

President of the network. During this lapse, the MTN-UK initially followed the guidelines outlined by the Mexican government, which were focused on scientific areas to foster collaborations, involving the fields of aerospace, ICTs, automotive, food and biotechnology, alternative energies, and nanotechnology. Seven 'National Contact Points' were also designated across several regions of Mexico, with the goal of identifying collaborative projects where Mexico could make use of the contacts, knowledge and experience of skilled émigrés in these scientific areas. With this initiative, the SRE and the Conacyt's efforts aimed to strengthen the internationalisation of Mexican scientific and technological institutions and, in general, to generate specialised projects with relevant effects on competitiveness, economic growth and employment in the country (Conacyt 2008b).

However, for Cynthia Vega (MTN-UK), these guidelines were too vertical, *'and people didn't know what to do'*. After similar concerns were raised by different MTN chapters in the world, towards the end of 2013 the MTN programme was re-structured, in order to have a more flexible approach in order to cover more areas and building a learning environment supported on best practices. The programmed also opened a new online platform to establish and monitor all the chapters in the world, and its activities included 'symbolic and identity politics' in Levitt and de la Dehesa's (2013) terms, which involved organising different networking, cultural and social events.

As a result, the MTN-UK was also re-structured in 2015. They would not focus on developing collaborative projects directly, *'but rather on facilitating them'*, according to Cynthia Vega. This way, the MTN-UK focused on three main areas: i. Community, ii. Entrepreneurship, and iii. Knowledge Transfer. As of 2015, the MTN-UK Board was comprised of 12 people, including a President, a Vice-President, and a global initiatives staff. The Mexican Embassy in the UK designated one person to act as a permanent liaison, and monthly meetings are generally carried out with the Ambassador of Mexico in the UK, in order to update him on the MTN projects: *'We talk about how the MTN is going, he gives us tips and we analyse problems. He's more like a mentor, giving us tips and assisting us'* says Cynthia Vega.

All of the members of the MTN-UK Board are skilled Mexicans, employed full-time in the British labour market, so they dedicate their remaining available time to manage the MTN-UK (Cynthia Vega claimed she dedicates at least four hours per week). They do not receive any payment or sponsorship from the Mexican government, but on the contrary, they must cover the expenses for their website and other instruments for communication and dissemination matters. However, the IME organises Annual meetings with all the Presidents of the MTN's chapters in Mexico, where all their expenses are covered. In these conferences, the Mexican government shares policy developments and promotes networking activities for the different Presidents of the chapters (González Gutiérrez 2009).

After this brief review of the MTN, the empirical evidence regarding existing/past long-distance collaborative initiatives that were analysed in *Part one* of this chapter arises two questions of paramount relevance for this study: why was the MTN not mentioned by any of the *Brains* in the collaborations they referred to? And moreover, what is the relevance of the MTN in tackling long-distance collaborative initiatives?

If, as *Part One* of this chapter showed, actual or previous collaborations with Mexico from the UK have taken place because of the *Brains'* own initiative, this reveals that the MTN has fallen short to face the challenges that these collaborations entail. As Boccagni's (2014) work showed in the case of the diaspora policy of Ecuador, the difficulties that sending countries face to develop institution-building processes are neither linear nor conflict-free, particularly when there are clear top-down attempts to institutionalise transnationalism from a state-bound perspective, such as the case of Mexico.

As has been discussed in chapter 2 (section 2.5.3), the diaspora option advocates for a new perspective of migration, from a notion of "loss" (or zero-sum game) to an opportunity for co-development, where diasporas act as a kind of "Ambassadors", and contribute to bring two countries with different levels of development together (such as Mexico and the United Kingdom), in order to work towards the achievement of different professional and scientific goals, under what could be framed as an example of scientific diplomacy. However, building bridges for establishing systematic

collaborations need to take into consideration several factors that have been overlooked or underexplored by Mexican policy-makers so far. The final section of this study addresses some of the main challenges and policy recommendations.

More particularities and details about the MTN-UK will be provided, as a way to illustrate how these challenges and recommendations can be applied to the realities of the Mexican case, and to diaspora policies as a whole.

6.8 Challenges and recommendations for diaspora policies to tackle long-distance collaborative initiatives

For Ritchie (2003), qualitative research –such as the present study— has clear strengths for policy studies, like its concern for processes and outcomes, its ability to study and describe such processes over time, or its capacity to comprehend contexts from the subjective realities of actors. For these reasons, the main challenges and recommendations to establish long-distance collaborations were developed from the accounts and viewpoints of the *Brains* and the *Officials*, as well as from previous studies of diaspora-engagement (or diaspora option) policies, the notions of science diplomacy, and my own interpretations.

These challenges and recommendations involve several issues, covering the role of the *Brains*, the role of the government and other stakeholders, and the policy design. I will analyse these challenges taking the MTN as my main unit of analysis, along with possible pathways of action. However, it is important to clarify that my findings do not intend to offer an overarching perspective on how the Mexican government is carrying out international scientific/professional collaborative initiatives. Many Mexican and British institutions may be well engaged in rich collaborations that are out of the scope of this research. My in-depth analysis on the issue of collaboration at a distance is limited to the accounts of the *Brains* and the *Officials*, with particular emphasis on the MTN-UK. However, as one of the largest networks of skilled Mexicans abroad, it does offer valuable insights on how the MTN is working, its policy design, its possibilities, shortcomings, and challenges for the near future.

6.8.1. *Information matters*: the challenge of knowing about the *Brains* abroad

As previous studies on diaspora-engagement policies have suggested (Rannveig Agunias 2009), the first challenge for these initiatives is to count on mechanisms to obtain up-to-date information about the location and composition (age, gender, years abroad) of skilled migratory groups. In addition, it is important to generate information on their fields of expertise, as well as their research/professional interests.

Notwithstanding, gathering information about the Mexican skilled diaspora in the UK is not a simple endeavour. According to Francisco de la Torre (IME), the government has very limited ways to monitor its citizens upon their departure, and is highly dependent on their own initiative: either by registering on the System of Registry for Mexicans Abroad (SIRME) on the Ministry of Foreign Affairs' website, or directly at the Mexican Consulate. Consequently, according to Francisco de la Torre, the IME estimates *'a strong underreporting, of at least 35%-40% of actual Mexicans abroad'*. Moreover, the information asked does not include details on skills, fields of work, and is not updated on a regular basis. The government thus lacks consistent information on the Mexican skilled diaspora, both in regard to reliable estimations on the number of Mexicans abroad, and moreover, about their location, work or interests.

The MTN-UK represent a noteworthy alternative in this regard, as in principle it has more detailed information about the number, locations and activities of the Mexican skilled émigrés in the UK than the Mexican Embassy. As Cynthia Vega (MTN-UK) explains: *'we have a database of around 350 members. Now we can contact people. Before we had no idea of what was going on. When we went with the Ambassador to introduce the idea of the MTN-UK* [in 2010] *we only had 30 members'*. This database includes one-third of my interviewees as registered members of the MTN-UK. However, if we take into consideration the estimated number of skilled Mexican expatriates in the UK, of 8,470 as of 2013 (McIllwaine and Bunge 2016), then we can conclude that the MTN-UK database falls considerably short by comparison to the target population: only 4.1% of the total universe of *Brains* in the UK are registered members of the network.

Another information issue has to do with dissemination. In the interviews, one third of the émigrés claimed that they had never heard of the network before the time of the interview, and the remaining third claimed to have heard of the network at some point during their stay in the UK, but are not registered members. I will explore further my interviewees' reasons for not joining, and the experiences of the members of the network in section 6.8.3. On the other hand, the flow of information within the network is also a relevant component. Communication by email is growingly focused in disseminating Conacyt and other arts and scientific-related calls and grants opportunities, as well as on promoting networking activities within the members of the MTN in the UK (fairs, meetings, lectures, branding and workshops). However, there is no information on the levels of response to those calls, and moreover, on the potential outcomes generated.

A final aspect to take into account relies on the issue of how to process large amounts of data. This thesis is informed by a relatively modest sample of 36 Mexican skilled émigrés' in the UK, and yet, it has generated a considerable amount of information about their pathways, achievements, connections and contributions to Mexico from the UK. A larger database would require a strategy for handling massive, often-changing information, besides investments in software, infrastructure and central headquarters. In order to manage collaboration projects at a larger scale, handling information may require competent staff specialised on Big Data and data analysis like *Chinos*, one of my interviewees (whose work is referred in chapter 5, section 5.3.3). However, some of the *Brains* expressed their lack of trust about sharing their personal information (name, fields of expertise, location, and so on) to the government, because of the possibility of misusing their information for other ends than those that were strictly scientific or professional. This is why security controls and strict data protection regulations should also be considered.

6.8.2. *Visibility and recognition matter*: the challenge of acknowledging the relevance of the Mexican diaspora

This study has insisted on the relevance that visibility and recognition entail as elements for building bridges with the *Brains* in the UK. Visibility and recognition

means that these Mexican émigrés also *matter*, and appear as an unavoidable step for providing incentives for collaborations. In previous research, Klekowski von Koppenfels (2015) found that in the case of the U.S., the American diaspora felt a disinterest and lack of recognition from the U.S. government, which resulted in turning away from a desire to promote their country's interests abroad. Recognition thus involves not only a necessary step towards changing the paradigm of skilled migration, but also willingness to recognise the relevance of a country's diaspora. In other countries, like Spain, scientific diplomacy is setting the basis for scientists to organise and improve their visibility, influence, and connections in different parts of the world (Elorza Moreno et.al. 2017).

As chapter 4 showed, a good number of the *Brains* felt that they represent Mexico from a distance, and are taking an active part in invisible colleges and communities of interest within their fields. Commitment to Mexico is frequent because of their *Mexicanhood* and prevailing links to the country (mostly relatives and friends). *Alejandro* has been abroad for more than 16 years, and understands the relevance of Mexican émigrés in the UK:

> (…) I think as a country we should use these diaspora as an element of representation of Mexico, rather than considering them as a loss. I think it's related to soft power. But for that Mexico needs to engage with these people: identify them, make them representatives of Mexico, give them confidence, provide support but also recognition of what they are. As such, they are ambassadors for Mexico, and the country thus will extend its soft power in the UK.

For *Alejandro*, skilled migrants comprise of brainpower that ultimately contributes to many fields, and as such, they can become an important source for scientific diplomacy and soft power, in a similar way as the numerous initiatives ran by the UK in Mexico that were analysed in chapter 4 (section 4.4.2), by promoting a good image of Mexico abroad. From this perspective, collaboration entails recognition: more than a "loss", the *Brains* are also opportunities to extend Mexico's connections and obtain benefits from the UK. As we saw in chapter 4 (see section 4.12) skilled Mexicans not only contribute in professional aspects, but also have an impact as "Ambassadors" on contesting stereotypes in their places of residence.

The MTN-UK is in this regard an important step towards increasing the recognition and contributions of Mexican *Brains* in the UK. Networking events, cultural competitions,

dissemination of scientific calls, and other initiatives bring these elite Mexicans *out of the shadows*, both in their receiving and sending countries. However, to date these initiatives appear fragmented and insufficient, particularly in view of the limited membership of the network (of 350 members). Additional strategies to disseminate successful collaborations and the achievements of the Mexican diaspora can contribute to their recognition. This is part of a broader policy design of the MTN-UK, which will be explored further in the next section.

6.8.3. *Policy matters*: the challenge of re-structuring the MTN

Despite its novel approach towards skilled migration, *Part one* of this chapter evidenced the lack of collaborations facilitated through the MTN. Earlier studies on the MTN (López Chaltelt 2009) have noted that the programme lacks a proper organisational structure to manage the network. In the present study, evidence has shown that despite recent efforts, the problem continues in many ways by lacking sufficient human and financial resources. In section 6.7 it was described how the MTN-UK operates with no budget, no seed capital for running projects and no full-time personnel, which has relevant effects on its scope and performance. Cynthia Vega (MTN-UK) is aware of such shortcomings:

> It needs more focus, which is one of the points that at least in the UK chapter we want to improve. So our engine is "small effort, big impact" to generate improvements in any area we want to support. Similarly, seed capital could help a lot, perhaps to hire someone full-time who could be in charge of the network. Another point is to establish a mirror network in Mexico, which could provide support to all networks globally to boost identification of projects, look for funding, or receive guests. If some VIP we know from here travels to Mexico, this mirror network could receive this person and introduce him/her to the Coparmex [one of the most important associations of entrepreneurs and corporations in Mexico], or to any other relevant stakeholder. That mirror is one of the initiatives that the UK chapter will be promoting, because we believe that it will improve the organisation.

This "mirror" network in Mexico that Cynthia Vega refers is of paramount relevance for the network's operation. In Spain, institutional efforts involved stronger inter-ministerial collaboration to assist bridge-building strategies. First, by linking all stakeholders in the Spanish Ministry of Foreign Affairs, where two public institutions took the lead to developing the network of potential science diplomats: the Centre for Development of Industrial Technology (CDTI) and the Spanish Foundation for Science and Technology (FECYT). In addition, scientists were appointed as scientific

coordinators to the Spanish embassies to the U.S., the UK, and Germany. These countries were chosen because of their scientific power, and also because they are the top three destinations of Spanish researchers. The goal of scientific coordinators is to become closely connected to the Spanish scientific community in these receiving countries, and to allow science to assume a central role in the diplomatic endeavours (Elorza Moreno et.al. 2017).

In the case of Mexico, things work differently. According to Francisco de la Torre (IME), there is an area at the IME in charge of providing support and monitoring the chapters of the MTN around the world. However, he also notes an important shortage in terms of personnel, which compromises an effective assistance to the chapters in fostering and strengthening collaboration initiatives:

> There is a Directorate within the IME dedicated full-time to assist the chapters of the network. Four people work there: a director, an assistant director, a policy officer, and an analyst. But a network that has so many chapters needs at least eight people organising meetings, teleconferences. A network like this will require more people as it grows, or there is a risk that the IME becomes irrelevant in this process.

From de la Torre's views, it is possible to conceive of the implications of having limited personnel in charge of managing the MTN in the Mexican government, particularly for articulating and supporting the chapters worldwide for fostering collaboration initiatives with the Mexican diaspora. Different to the Spanish case, no scientific coordinators are appointed in the most relevant Mexican Embassies or Consulates. As an effort to overcome such limitations, de la Torre stresses that for the last three years, the IME has organised and sponsored different activities for bringing the Presidents of the MTN chapters together. But besides organisational limitations, to him it is important to add budgetary constraints as relevant factors to consider, as the priority of the IME is focused on assisting the vast Mexican migratory movements to the U.S. (mostly semi or low-skilled):

> I think that as the Mexican government, we have to be able to "cluck over the eggs" laid by the chapters [a Mexican expression that means "brag about good outcomes"], but as an apology or justification, we have to support 12 million Mexicans every day who tell us "help me with vaccines, help me with literacy..." so we must divert, or prioritise our efforts in the IME. It's not easy. What are we going to give more importance? To the Mexicans that need access to a vaccine, or who cannot write, or to the chapters, so they can knock the doors of the INADEM [the Mexican Fund for Entrepreneurship], or the Conacyt? Who do you give more importance to? It's a strong case, and therefore it's very important that we strengthen the MTN programme.

As Francisco de la Torre highlights, the priorities of the IME are focused on attending to the vast number of Mexicans in the U.S., and not on the skilled Mexican diaspora abroad. Consequently, there are evident personnel and budget limitations to boost the connections of Mexico to its diaspora, and projects lack monitoring and planning, which neither the IME nor the Conacyt have proper resources to do.

This is why, even though positive views about the general idea and purpose of the MTN-UK were common among the *Brains*, there is a widespread negative perception about its performance. *Antonio* shows how the shortages mentioned have an impact on his interest to engage in the network, as at the time of being interviewed he had decided not to become a member, despite having contact with the Board of the MTN-UK:

> Unfortunately I have not followed-up the network because to me, good ideas without actions are hallucinations. And I think they [the MTN] are like this. People with very good intentions and very good training lead it! But their income doesn't depend on it. So it's a hobby, whenever they can spend some time on it. That's why I prefer to dedicate time to the Chambers of commerce. In business where you spend 100% of your time, you will obtain more than in business you only look after whenever you can. In the Chambers of commerce there are people working full-time. Maybe they can do it because they have sponsors and members providing a significant amount of money per year. But that doesn't happen with the MTN, and people must maintain themselves from somewhere.

As with *Antonio*, other entrepreneurs are seeking links towards collaboration and business opportunities between Mexico and the UK on their own, rather than looking for the support of the MTN: *Mango*, for instance, claims that the MTN-UK is still *'weak'*, and appears more like *'a group of friends'*, rather than as a network for establishing collaborative links.

In other words, for the *Brains* in the UK, the MTN-UK is not perceived as a relevant community of interest, neither professional nor scientific by the *Brains*. According to Tejada (2012), in order for diaspora policies to increase their chances of achieving successful collaborative projects, it is necessary that skilled émigrés feel motivated and supported at an institutional level in both receiving and sending countries. However, additional funding and personnel to manage the MTN (in Mexico, in the chapters or in the diplomatic representations of the country) seem essential to increase the collaborations. The MTN may not only need to be re-structured, but importantly, to receive a priority in the migratory, scientific and development agendas.

6.8.4. *Projects matter*: the challenges for collaboration projects

Even though three-quarters of my interviewees claimed to be interested in further collaborating, or starting a collaboration with Mexico from the UK, immediate questions emerge around issues of *how to collaborate. C*ommon requirements outlined by the *Brains* to join in long-distance collaborative initiatives included projects' objectives, roles and inputs needed, institutions and people involved, timelines, goals, transparency, de-politicised objectives (no "hidden agendas"), scope of the projects, funding assurances, and expected outcomes.

Almost all of the *Brains* claimed to be willing to dedicate additional working time for a collaborative project with Mexico, on the basis that the project is worthy. Nevertheless, as has been noted, none of my interviewees who are members of the MTN-UK seemed to have incentives to contribute to Mexico through the network. The reasons have to do with non-existent projects in their areas, a lack of concrete projects (even when there are common interests), or faulty organisational conditions (noted in the previous section) to become involved. In this regard, Cynthia Vega (MTN-UK) stressed this issue regarding the network's member participation:

> We have 350 members, but many are not very active. We see them randomly. That is in our plan: to see how we can facilitate more connections, because we can't do everything. Some alternatives we have thought about range from how to liaise with the Mexican Chamber of Commerce, or how to approach the Embassy... those kinds of connections. Right now we are focused on the background –agreements, memorandums of understanding, networking, and so on— so that members can use them whenever they want to do something.

Cynthia Vega explains that besides the shortage of members that has been noted earlier, the MTN-UK's registered members are barely active, which suggests that potential collaboration activities lack incentives, projects, and conditions to materialise. When asked about specific projects accomplished since the creation of the MTN-UK, Vega named as the most relevant: two articles in *Pro-México* (a Mexican business and tourism magazine financed by the government) where they promoted the "Mexico Brand" and the possibilities for importing Mexican food and drinks to the UK (a growing market in the country, as we saw in section 6.5), the participation of Mexican entrepreneurs in the G20 Young Entrepreneur Summit, the organisation of *Britmex* (a start-up event with the collaboration of Chevening alumni), a report on

migration for the Mexican Embassy in the UK, guided visits to companies where the MTN members work, support of cultural events in the UK and Mexico, and several networking events in the UK for its members. Albeit relevant, these initiatives still lack a specific impact in Mexico.

Perhaps as a consequence of its faulty structure, the MTN-UK faces the challenge of materialising collaborative projects and encouraging its members to participate. Besides improving their membership, the MTN-UK needs to be supported in order to create more suitable conditions for participation. From 36 individual stories, numerous potential projects emerged, but better communication and networking channels could increase the possibilities to make more systematic collaborations with Mexico.

6.8.5. *Politics matters*: the challenges of trust and legitimacy

The widespread perception of an adverse social and political situation in Mexico (addressed in chapters 4 and 6, sections 4.11 and 6.6, respectively) should not be disregarded by state-led policies when suggesting the "diaspora option" as an alternative to face the negative aspects of skilled migration. As was explained in chapter 2 (section 2.5.3), this is also a highly relevant issue to take into consideration within scientific diplomacy, as it seems to be overlooked.

Diaspora studies have shown that many of these initiatives have been widely centralised, top-down implemented and very selective, in order to strategically manage what migrants *can and cannot do* (Levitt and Glick Schiller 2004). According to Boccagni (2011), these communities are not only dispersed, but also tend to manifest a 'deep-rooted disenchantment' towards political institutions back home. In this case study, the perceptions of the Mexican émigrés reveal a political perspective that has been vaguely addressed in the analysis of the MTN and within studies of the "diaspora option": there are important issues regarding criticism and scepticism towards the Mexican government, which affect key issues for collaboration.

The political aspect is then crucial for identifying the reasons for the limited success of the MTN-UK so far. In the interviews, the *Brains* expressed their concerns for establishing collaborations with the government, in view of risks of politicisation and

electoral intentions behind collaborative projects. Other relevant issues point to concerns in transparency in the spending of resources, as well as scepticism about the potential use of their personal data. Untrustworthiness towards the Mexican government is a component that needs to be taken into account, particularly when, as Wagner (2008) has noted, scientific collaborations in the invisible colleges are based on trust, understanding, and mutual benefits.

Among my interviewees, the *Brains* who are engaged in political activism and social entrepreneurship activities (addressed in section 6.6) were more emphatic in their scepticism about the close relationship between the government and the MTN, like *Raúl*. To him, the autonomy of the MTN-UK is actually nullified by politics, as there is great dependence between the MTN's Board and the diplomatic representation of Mexico in the UK:

> (…) Since it's not really autonomous [the MTN], many things are lost. That is, they are linked to the government, and the Mexican government and Mexican politicians have no way of not being political, to make decisions based on their political interest. So everything gets messed-up, because then we can't discuss issues freely, without politics. We can't talk about development without politics, and that's what Mexico needs! We need transparency, we need honesty, and we need professionalism to move forward, step-by-step. But it's a group that is already politicised, I think, and it's a disgrace (…) I heard about the network, I found out more and became a member. I contacted them, two or three years ago, from its beginnings and attended one of the first meetings, but it was very political. The guy who was leading the network was a full-grown politician. Anyway, I showed interest in coordinating efforts in aerospace, and told him about it, but he had other friends to take charge of that, and that was it. Gradually I heard how things were handled and I took my distance.

The risks of politicisation and the widespread scepticism about the government have affected the MTN, as it is not perceived as autonomous, and moreover, it jeopardises the focus on collaboration projects under scientific and professional grounds.

For this reason, it is suggested that a wider involvement of different institutions, social actors and professional associations may contribute to counter the issue of mistrust. In principle, not every government agency was perceived in the same way by my interviewees. Perhaps influenced by their former status of grant holders, many of them recognised the Conacyt for its transparency, trajectory and prevalence for supporting scientific research in Mexico, even during economic turmoil over the last four decades. The positive views towards the Conacyt are frequently related to its de-politicised condition. On the other hand, one-third of the *Brains* were found to have

links to professional associations in Mexico, which overall have a much higher level of acceptance and trust than the Mexican government. At least ten Mexican professional associations, colleges, institutes and societies were mentioned among my interviewees, where collaboration could flourish in a more professional way. Continuing with *Raúl's* account:

> It [collaboration] would have to be somewhat apolitical. If I had that confidence, I would love to [collaborate]. For example, an activity supported or promoted by a professional association. Two weeks ago I was giving a course sponsored by the Royal Academy of Engineering of Spain. That was great, because there is no political tinge, but neutrality, so I feel that my contribution is effective, because it's democratic (...) because in Mexico there is a tradition of a corrupt government: we are in place 106 of 177[40] globally. We are a corrupt country. Therefore, the best thing the government could do is to strengthen civil society. Talking about these issues, strengthening civil society means empowering professional associations, in my case, the Mexican Academy of Engineering, they are the ones who should delimit collaborations. (...) To remove that dark cloud of corruption, I would empower other honest institutions, with principles.

This way, the political sphere shows that the Mexican government is not only associated to the perception of an aggravated social situation, but also is widely perceived with scepticism. For this reason, as many *Brains* suggested, other professional associations in Mexico may likewise be more trustworthy institutions to seek for long-distance collaborations. State-led transnationalism and scientific diplomacy, from this perspective, have a clear challenge: the *Brains* cannot be told what to do and their support cannot be taken for granted, but on the contrary, openness, trust, and de-politicisation are important elements for long-distance collaborations to take place. Both diaspora policies and scientific diplomacy need to take a closer, more realistic view into the political side of migration, and moreover, on the politics involved within scientific/professional collaborative initiatives.

From the empirical evidence, this study suggests that the participation of a wider array of institutions is thus needed to transcend the current perception of the MTN as a state-led initiative. More comprehensive collaboration and links between different stakeholders, under more comprehensive collaboration models (such as the triple helix addressed in chapter 5, section 5.3.5) seem to be pertinent elements for increasing transparency, reducing scepticism, and focusing better on the needs in different fields

[40] *Raúl* refers to the 2013 figures of the Corruption Index published by Transparency International. In 2015, Mexico occupied the place 95 of 168 of the same index, and is considered the most corrupt of OECD countries. (Transparency.org. http://www.transparency.org/country#MEX [accessed October 18, 2016]).

in Mexico. This way, long-distance collaborative projects, complex as they are, would nevertheless become more systematic and feasible.

6.8.6. *Institutions and regulations matter*: the challenge of innovation, flexibility and internationalisation

Related to the previous topic on the need for de-politicisation, distant collaborative projects require more comprehensive articulations at the institutional level, which imply a closer interaction between academia, government and the private sector, in order to boost collaborations into more fixed and systematic practices. In addition, inter-ministerial organisation is also needed within the government. Within the government, increasing awareness of such needs appears to be taking place. Besides the IME, the Conacyt is also taking steps from the new dynamics of skilled migration. For its Director General, Enrique Cabrero:

> We have to deploy a number of strategies to be able either to retain our human talent in the country, or to keep it closely linked to the production of knowledge in Mexico. For us, Dr. Mario Molina, our Nobel Prize in Chemistry[41] is highly influential, as a clear example of someone who conducted basically all his research in the U.S., which earned him the Nobel prize, and since then –actually even before, but especially from that moment on— he has had a very close relationship with Mexican institutions. For example, the Mario Molina Centre [a think-tank for alternative energies and environmental studies] which Conacyt supports enthusiastically, is of mutual benefit, not only from the knowledge of Mario Molina, but from all research networks which he is related to, and is connecting with working groups in Mexico. It's a clear example, and a very symbolic one because he has a Nobel prize, but it's evidence of how a Mexican can generate much greater benefits abroad than possibly doing research stay in Mexico for decades.

In this anecdote, Dr. Cabrero shows an informed view on the relevance of communities of interest that an eminent Mexican scientist like Mario Molina has formed/joined throughout his career, which scientists and research centres in Mexico can now access and have important effects on knowledge production. In the interview, Dr. Cabrero also mentioned two relevant changes regarding the Conacyt. First, he mentioned the changes in the regulations of its scholarship programme (as noted in chapter 4, section 4.4.1), under which students can now obtain their discharge letter to remain abroad as long as they establish long-distance collaborative projects with Mexico. And second, he mentioned the 2011 modifications to the National

[41] In 1995, Mario Molina became the only Mexican to have been awarded a Nobel Prize in science. In 1974, Mario Molina and Sherwood Rowland demonstrated that CFC gases had a damaging effect on ozone in the atmosphere (nobelprize.org http://www.nobelprize.org/nobel_prizes/chemistry/laureates/1995/molina-facts.html [accessed October 18th 2016]).

Researchers System (SNI) that were noted in section 6.4, which grants the possibility to become a member of the SNI from abroad. Returning to Dr. Cabrero:

> Even when the new SNI regulations don't pay any financial compensation [to the skilled diaspora], since they are abroad, they can easily access this compensation in case they decide to return to Mexico. This has had a significant impact on the enrolment of SNI researchers abroad. I think that we passed from around 100 researchers enrolled from abroad, to more than 1,800 now, if I'm not mistaken.

These changes in regulations (from a top-down approach) are being taken with the objective of providing new incentives for the Mexican skilled diaspora, so they can remain in contact and establish long-distance collaborations, under more flexible institutional schemes. As Melchor (2016) shows with the case of scientific diplomacy in Spain, these flexible collaborative schemes may provide additional incentives for skilled émigrés to create links, and eventually, to facilitate their return to the country.

As the most important community of interest for science in Mexico, the relatively recent SNI regulations are already achieving an increased number of members abroad and growing links. However, from the perspective of the *Brains* (a bottom-up approach), these changes are yet to be effectively communicated to the diaspora. As a SNI member from abroad, *Alejandro* is frequently contacted to review different academic projects in Mexico, but claims that the process to become a member of the SNI offers limited incentives to contribute:

> Access to SNI must become more flexible. Many of these Mexicans would be willing to collaborate, and yet the motivation to do it is very difficult, because filling forms and even uploading your CV in the Conacyt website is one of the most difficult nightmares I've seen in my entire life! So we need to make it easier for these people to feel attracted to the idea (…) I think another thing that Mexico has to do is invite these people over for national consultative forums in Mexico: that way you make the most out of what these people do and know. We need more platforms to encourage this.

As *Alejandro* suggests, a change of paradigm to reach more scientists abroad needs to be supported by user-friendly online platforms and other initiatives (consultation forums) that would increase the *Brains'* visibility in Mexico, and create more incentives to become engaged. This may be the reason why, as of 2016, only 695 Mexican researchers abroad were members of the SNI; 50 of them reside in the UK (Conacyt 2016).

On the other hand, many of the *Brains* interviewed appeared uninformed about the new regulations outlined by the Conacyt concerning the scholarship scheme. Section 6.4 noted how *Cris* was the only interviewee who was able to formalise a collaborative project (as a visiting lecturer) after the Conacyt increased the flexibility of its scholarship programme. To her, however, the procedure was not easy:

> Promoting communication with other groups and other countries is very important. This is something Conacyt does, but at a superficial level, and it's very important to maintain the link. Using the Conacyt's grant holders for example, is something that isn't really done. From what I know and have experienced, it seems very important to have a network, because as a grant-holder you have a responsibility. But if this potential is reduced to saying, "you have to return or to refund the scholarship" is just wasting potential (…) Conacyt should promote more the mechanisms by which you can collaborate, because in my case it was very difficult to get that information. I had to work a lot (many e-mails, and calls) in order to get that information. Many people actually told me "no, no! You need to go back within 6 months or refund the scholarship!" but it's not true anymore. However, that creates a lot of anguish and I think it's unnecessary.

As *Cris* suggests, long-distance collaborative projects can become more feasible and systematic if the actual regulations become more widely advertised and promoted. It should not be overlooked, however, that a more active promotion could also increase the chances for more *Brains* to remain abroad, but it would also increase the possibilities to maintain closer communication with Conacyt's former grant-holders, and keep them linked to Mexican needs, as Dr Cabrero noted. In this regard, the estimations made by the Conacyt in 2000, regarding the percentage of grant-holders who do not return to the country should be revisited, to observe if this percentage of 'no return' continues to be in 5% of the total number of students supported.

Other reasons highlighted by the *Brains* as institutional restrictions for engaging in long-distance collaborative initiatives have to do with insufficient internationalisation and the presence of rigid bureaucracies. In the case of *Salvador* (whose research on bamboo was addressed in section 6.1), these factors have prevented him from speeding-up academic exchange between his academic institution in the UK and UNAM:

> Right now I'm trying to start academic links with UNAM, because we have research projects where we overlap in interests, so I'm trying to encourage those links. The first communication was by mail, but we want to formalise the approach. We are trying to complete a memorandum of understanding to exchange research, students and so on, but the level of bureaucracy on both sides is impressive. It will take a while, I think.

Despite decades of government-sponsored Mexican students traveling to the UK, the emergence of more formal scientific and educational collaborations between Mexico and the UK is recent. As we saw with *T's* account (section 6.3) in 2009 the Conacyt was barely known in the UK, and memorandums of understanding between universities were non-existent. However, they also stressed a slow, but noticeable change around more integration and openness towards innovation. On the side of Conacyt, Dr. Cabrero reinforces this vision:

> We are already generating a shared vision, not only from the Federal government, because that's part of the problem. The government has ideas with a limited period of Presidential Administrations [six years], in which governments start, apply and leave. Nowadays we are outlining policies together with the productive sector and academia, with the idea to ingrain an innovation-oriented national culture. I think in the next five years we will see significant changes in this regard.

From a policy perspective, projects involving collaboration at a distance need solid institutional backgrounds to support them. Openness, internationalisation, more flexible schemes, user-friendly platforms, and a more robust communication with the skilled diaspora were highlighted as valuable elements to consider in state-led transnational efforts. These elements may contribute to transcend an excessive dependency on the *Brains'* individual initiative, and establish broader institutional alliances.

6.8.7. *People matter*: the challenge of teamwork, common interests, and culture

If, as the empirical evidence has suggested, global trends like transnationalism, skilled labour and migration happen *because of* people, long-distance collaborative projects thus entail taking in consideration mechanisms for people to meet and work together in diverse ways, according to their fields of work/study.

In the interviews, the *Brains* with previous experience in remote scientific collaborations explained that, even from afar, researchers and professionals eventually needed to meet, agree on collaboration terms, establish goals and harmonise levels of responsibility. Besides the issue of considering imbalances for defining roles, other factors, such as group chemistry, trust, language or cultural differences are relevant challenges to take into consideration:

> For collaborations to work, you must hold people very responsible on both sides (...) I've had experiences (…) managing several projects between Mexico and my university. I had a project in which researchers simply didn't get along, and it was a total failure. And they spoke the same language of science, but they didn't like each other. I've had other projects, in Sweden, Ireland and Spain, but it's the same. There has to be chemistry between researchers. They have to like each other. And they have to be responsible. It's the same as in Mexico. You collaborate with whom you like, with whom you trust. In my case, what I do is that I create a project with a principal investigator, and everyone else can suggest goals, but me and my peers remain in close touch, being realistic, thinking about the capabilities that each person and each lab have. – T

As *T* reveals, distant collaborative projects need to consider that, as in many invisible colleges, researchers may not know each other in person. Agreeing on whether or not to collaborate then depends on researchers defining clear responsibilities and limitations of each group. *AGG* complements this argument by highlighting trust, again, as an essential step in these kinds of collaborations:

> I don't know what I'd think if I were matched with "John Doe" to work, as I have no way of knowing the morals of that person. I feel collaboration needs first an arrangement on a personal level. I wouldn't be able to work with a thing like "we need this collaboration so we matched you with Mr. X and Mr. Y" but rather "let's sit down and organise a round table with the people who work on tuberculosis in Mexico". There is a human component, in which you have to rely on the work of the other person who will collaborate.

From *AGG* and *T's* anecdotes, it is possible to observe that collaboration projects are usually initiated by researchers of similar fields, who focus on exchanges and possibilities among their laboratories, research interests, and objectives. As Wagner (2008) argues, such collaborations within invisible colleges are not easy to track for state-led initiatives, and fostering more systematic efforts can indeed be challenging, given the complexity of elements like group chemistry, language and other cultural differences. From this perspective, collaboration at a distance ultimately appears as another means for human interaction, connecting skilled Mexicans within the country with skilled Mexicans abroad. This suggests challenges for outlining common 'paradigms', in Crane's (1972) terms, defining scientific/professional priorities, and outlining expected outcomes for the benefit of both groups/individuals.

6.8.8. *Imbalances matter*: the challenge of imbalances for the feasibility of collaborative initiatives

The imbalances addressed in chapter 5 are serious challenges to consider for assessing collaboration from a distance as an alternative for skilled migration. As the result of a diverse range of developments, the rules of political and economic arrangements have

multiple implications in labour markets for the highly-skilled. Moreover, as *Charantulo* and *Mariana* noted in chapter 5 (section 5.1.3), "outsourced" skilled labour is a reality in the context of globalisation, where knowledge is often produced 'without taking less developed countries' needs into account' (Shrum and Shenhav 1995, 5). These are elements of a reality that needs to be recognised in order to assess the feasibility of long-distance collaborative projects.

In addition, differences in the development of scientific fields may represent problems for identifying common research interests among invisible colleges. Some of the *Brains* claimed that during academic visits and conferences in Mexico, they felt that there was little room for discussing their research topics with their peers, given that their fields either had unequal levels of development, or simply were non-existent. These views suggest that it is important to approach collaborations with a level of realism on their scope, with levels of exchange depending on the resources available.

On the other hand, abysmal differences between Mexico and the UK regarding budgets and investments are likely to continue. As we saw in chapter 5 (section 5.3.1), budget cuts to Conacyt due to plummeting oil prices and other economic turbulence adds to the adversity, with relevant effects in scientific research, talent retention and talent attraction. A recent study about French researchers in Mexico found that monetary constraints in their projects discouraged collaboration (Badillo and Didou-Aupetit 2015). However, the *Brains'* experience in the UK showed that many researchers have access to diverse funding sources to continue fostering scientific collaborations with Mexico. After the Dual Year of Mexico in the UK/UK in Mexico, in 2015, both countries reached different collaboration agreements that could be associated with clear scientific diplomacy goals. For instance, the Newton Fund is part of the UK's Official Development Assistance Programme, which aims to promote development in scientific and innovation fields, as well as to promote economic growth and social welfare in less developed countries. At the same time, the fund aims to continue fostering the UK's role in the creation of innovation ecosystems –or in this study's own terms, in forming invisible colleges and communities of interest. Mexico is one of the partner countries of this programme, and will receive funds for £12 million

from 2014 until 2018[42]. Likewise, the UK announced that the new Prosperity Fund would allocate £6 million for Mexico in 2016-17, a large proportion of which will be allocated to working on projects focussed in areas like education, energy efficiency, Rule of Law and sustainable planning[43].

Other relevant funding possibilities are the higher education institutions' own scientific diplomacy-related initiatives to liaise with Mexican institutions. For instance, the Research Catalyst Awards, sponsored by Santander Universities, has run since 2011 and have supported over 40 visits to universities in Argentina, Brazil, Chile, Colombia, Mexico and Peru to support the development of research collaboration (joint seminars, workshops, or funding applications, among others). As has been shown, there are several possibilities to fund collaborative exchanges, either from the *Brains'* access to diverse funds and grants, or from the numerous funds supported by the British government (Prosperity and Newton Funds for instance), the Mexican government, and other funds from research agencies and higher education institutions. Within these possibilities, successful collaborations will depend on opportune information provided to the Mexican scientific community, and overcoming the language barriers that we have observed in chapter 4 (section 4.1.2) and chapter 5 (section 5.3.7), to continue being obstacles for the Mexican skilled personnel who did not leave the country.

Within the imbalances of budgets and investments, we saw in chapter 5 that the low and often changing levels of investments in scientific research in Mexico have profound effects on increasing uncertainty, obstruct long-term planning and impacts on research outcomes. In this case, the British example may also offer other possibilities: the relatively recent 'ring-fencing' strategy to fund at least a part of the science budget could, for instance, increase the levels of certainty that are needed for R&D activities, as the Mexican government would be able to commit to provide a fixed amount of resources to priority research areas throughout a Presidential Administration, and at the same time, would also be able to push for a larger

[42] Source: British Council (https://www.britishcouncil.org.mx/newton-fund [Accessed December 2016]).

[43] Source: Joint Communiqué between Mexico and the United Kingdom, 2nd of May 2016. (https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/520914/Joint_Communiqu__between_Mexico_and_the_United_Kingdom.pdf [Accessed June 2016]).

commitment of industry. As we observed in chapter 5 (section 5.3.3), in 2014 Mexico invested 0.56% of its GDP in R&D activities, whereas the UK invested 1.63%. However, 65% of the investment in Mexico came from public resources, whereas only 26.9% of the British investments are publicly-funded. If Mexico wants to progress in its integration to knowledge economies, the public percentage needs to increase, and more importantly, industry needs to assume a far more relevant role. Protecting a part of the R&D budget could provide a more suitable environment to increase the industry's involvement.

The third aspect is related to the commodification of specialised knowledge. The *Brains* who work in the private sector (particularly in fields like data analysis, financial risk assessment, or in creative activities in automotive or aerospace industries) expressed that, even though they are immersed in intense remote collaboration activities with numerous countries worldwide, their companies are keen on protecting information, and they often work under strict privacy and copyright agreements. As for academia, the *Brains* noted that carrying out frontier-research frequently involves patents, data protection and other initiatives that may hinder the scope of collaborations. The Conacyt is aware of this, as Dolores Sánchez explained: *'If we talk about a knowledge society and a knowledge economy, knowledge flows, but it does so with rules. The most evident ones are intellectual property rules and patents, to which we all abide'*. Collaboration projects then need to think of these regulations to outline realist expected outcomes.

Finally, distant collaborative initiatives do not imply that Mexico should put aside longstanding efforts to retain its talent, and even to set more robust strategies for attracting foreign talent into the country. In this study, we have observed how knowledge-based economies around the world articulate immigration and non-migratory policies (chapter 2, sections 2.5.1 and 2.5.2), as they conceive skilled migrants as relevant elements to boost their competitiveness and secure their levels of prosperity. Perhaps more important than the harsh realities from the imbalances addressed in this study, the Mexican fluctuating agenda towards the retention/attraction of *Brains* reveals a reluctance to play a more decisive role as a knowledge economy. For example, the Conacyt implemented a scholarship

programme in 2011 for attracting foreign students, with the view of nurturing the cosmopolitan component of high-quality Mexican postgraduate programmes. However, according to Dolores Sánchez there is no intention to retain them in the country:

> (…) I'm not sure that towards the end of the year we will be able to reach more than 3,000 foreign students sponsored by the Conacyt, but it's still a modest number considering we have 1,827 high-quality postgraduate programmes (...) We don't share the idea of them staying in Mexico, because attracting foreign talent to stay is not the purpose of this scholarship programme. No way. That's not the purpose. In fact, in most of the agreements we demand that there is a tutor in charge of tracking the performance of the grantee, in order to keep the student connected to his/her country, with research topics associated to their country of origin. This strategy allows us to return those students to their countries after completion of their studies.

From this view, and taking into consideration the fluctuating agenda of Mexico in regard to skilled migration (addressed since the introductory chapter), it seems that the country is still lacking agreement on *what to do* about skilled migration (both for skilled émigrés coming to the country, and for Mexican *Brains* leaving), and what should be its role regarding the current global trends of knowledge economies. In this aspect, the relevance of scholarships as attraction and retention strategies ought to be reconsidered.

In sum, imbalances point to realities that must be acknowledged in order to face the challenges of skilled migration, and moreover, to draw on feasible long-distance collaborative initiatives. Besides differentials in scientific and professional fields, infrastructure, equipment, or budgets between Mexico and the UK, there are also political and economic issues and regulations (copyright, data protection, patents, and other issues) that may hinder some initiatives. On the other hand, the views from the *Officials* show that government agencies need to consider a closer articulation of strategies for creating new professional/scientific opportunities, in order to retain Mexican skilled personnel, and to attract foreign *Brains.*

However, the *Brains'* experience has shown that collaboration at a distance is a valuable means for building bridges between them and Mexico, and in their role as "Ambassadors", may greatly contribute to reduce evident asymmetries between countries with different levels of development, and consequently, to mitigate the negative effects of their departure. More systematic collaborations could be possible if

the transnational potential of skilled émigrés is reconsidered, the new possibilities of scientific diplomacy and their access to the British and Mexican scientific/professional landscapes is redirected towards highlighting their role as gate-openers, in order to create "virtuous circles" of scientific/professional exchange.

Conclusions

This chapter explored collaboration at a distance as means to achieve a more balanced exchange between Mexico and the UK. From the accounts of the *Brains* and the *Officials*, the scientific diplomacy approach, and a prospective position, the objective was to suggest some ideas and policy recommendations to build more bridges with the Mexican diaspora, as a way to mitigate the negative implications of skilled migration.

Part one showed that more than half of the Mexican scientists and engineers in the UK I interviewed are (or have been) engaged in a different collaborative initiatives with Mexico from the UK: from physical to virtual environments; from fixed to more temporary collaborations; or from short to longer-lasting effects. From the experience of the *Brains* in the UK, it has been possible to observe how these émigrés have made use of their "membership" of invisible colleges and communities of interest in order to establish bridges with Mexico. From the perspective of scientific diplomacy, the evidence shows how these *Brains* have effectively become "Ambassadors" to bring two relatively distant nations closer towards the achievement of valuable scientific/professional goals. However, these collaborations were found to be far more common with the case of *Brains* conducting research-related activities than those conducting non-research related activities in the private sector. Perhaps more important, it was found that the bridges built so far have been possible essentially because of the *Brains'* own initiative, with almost no involvement of the Mexican government.

Teacher-apprentice and peer-similar collaborations have shown how, from these communities, the *Brains* have been able recruit students (either through postgraduate programmes or temporary stays), engage in more dynamic exchanges between the North and the South through joint research and publications, and contribute to the internationalisation of several institutions in Mexico. Capacity-building activities, on

the other hand, were mainly addressed by senior Mexican scientists in the UK (professors), who either make use of the knowledge-production capacities in the UK to conduct research on unexplored topics in Mexico (as relevant as neglected tropical diseases), open the gates of British postgraduate programmes for Mexican students from lower socioeconomic backgrounds, and under more complex collaborative schemes between their institutions (in what could be framed as a dimension of scientific diplomacy), have also been able to transfer equipment, knowledge and techniques to their peers. The contributions from senior scientists (who left Mexico a long time ago) show that valuable collaborations, and their own sense of *Mexicanhood*, can transcend the passage of time and distance.

On the other hand, the expansion of ICTs has paved the way for virtual collaborations. In academia, such collaborations can represent important alternatives. Through Conacyt's relatively recent regulations, the *Brains* are now able to become members of the National Researchers System (SNI) from abroad, where they can relate better to different invisible colleges and communities of interest in Mexico, and contribute with peer-reviews of academic papers, research projects or grant applications. Other virtual activities included online-lecturing, where the *Brains* can contribute more actively in Mexican highly-skilled formation from the UK. Although in smaller numbers, the *Brains* in the private sector were also found to be involved in introducing technologies into Mexico from their expertise in the UK.

Other *Brains* were found making use of their expertise about the business environment in the UK. Their transnational condition and knowledge of the British landscape has allowed them to identify business opportunities and engage in business entrepreneurship activities with Mexican companies. These collaborations offer important alternatives for increasing the commercial exchange of two relatively distant markets, with the *Brains* as key drivers.

The final collaboration relied on social entrepreneurship and political activism. Even though this study was focused on scientific and professional collaborations, the widespread perception of Mexico's aggravated social landscape among the *Brains* deserves particular consideration. As part of their transnational identity, most of the

skilled émigrés remain informed on the social and political landscape of Mexico, where perceptions commonly associate problems like corruption, lack of Rule of Law, violence, insecurity with the government's responsibility. This perception has motivated some of them to take action in political activism or social entrepreneurship projects. These kinds of collaborations convey with previous findings that argue that elite transmigrants can undermine the authority of the government beyond its borders (Weeks and Weeks 2013) and become important sources of international criticism to governments. To a greater extent, the considerable levels of scepticism and criticism found towards the Mexican government should be taken into consideration for assessing long-distance collaborative initiatives through state-led transnational policies, such as the MTN.

Existing/past collaborative initiatives suggest that a contemporary understanding of the brain drain –involving a transnational perspective, the *Brains'* choices and decisions, their access to communities of interest and invisible colleges, the role of scientific diplomacy, and their immersion in the skilled labour market in the UK— can contribute to allay part of the negative aspects of skilled migration, and consequently, to make use of collaboration at a distance as means to achieve a more balanced exchange between Mexico and the UK.

However, *Part two* showed that collaboration at a distance is indeed a complex endeavour. From the past/existing collaborations, the focus was placed on the role of the Mexican government in tackling these initiatives, mainly through the MTN, as the most important Mexican effort for diaspora-engagement. As has been argued, Mexico has not been absent from the changes to the brain drain paradigm, as many of the *Officials'* anecdotes showed. In many ways, important steps have been taken towards a better policy approach to skilled migration, such as more flexible regulations of Conacyt's scholarships for studying abroad or the new schemes for allowing Mexican researchers abroad to become members of the SNI. Within this paradigm change, Mexico also outlined its diaspora-engagement policy, the MTN. Since its creation in 2005, the MTN has had achievements that must be acknowledged. The 34 chapters opened so far in different locations in the world reveal an interest (at least in principle) by both the government and the Mexican skilled diaspora around the world to get

more closely connected. In the case of the MTN-UK, networking events promote more nexus between skilled émigrés in the UK, and relevant calls from Mexico (research, news, contests, events, or grant applications) are now being disseminated through its communication channels.

As the empirical evidence showed, however, the success of the MTN in mobilising the diaspora under new paradigms has not resulted in significant collaborative projects so far, and the *Brains'* and *Officials'* views revealed several issues. On the one hand, the MTN lacks essential policy instruments to engage with the Mexican émigrés in the UK. Key shortcomings pointed first (section 6.8.1) to the extended lack of information on the location, activities and ways to contact the *Brains*, as well as a limited number of registered members of the MTN-UK (only 350 members of a total universe of 8,470), and insufficient levels of participation. Secondly, the MTN needs to generate more visibility and recognition (section 6.8.2) to the Mexican skilled diaspora in the UK, as relevant incentives for scientific diplomacy, and to become engaged in long-distance collaborative initiatives.

On the other hand, the anecdotes highlighted an insufficient institutional support in Mexico (section 6.8.3). As the President of the MTN-UK noted, the absence of a robust 'mirror' chapter located in Mexico affects the chapters' management; the lack of financial support (no budget is allocated for the management of the MTN chapters in the world, and no seed capital is given to foster collaborative initiatives); and deficient organisation, given that the MTN-UK has no full-time, competent staff in Embassies or Consulates to arrange collaborations, which are greatly needed for scientific diplomacy and long-distance collaborative initiatives to take place.

Another issue was revealed in the limited number of projects (section 6.8.4) carried out by the MN-UK (at least, as of 2015), which reveals that more incentives, and clearer ways to contribute are needed. But perhaps more important, one of the main issues found with the MTN is related to the political sphere (section 6.8.5), particularly to the issue of legitimacy. The MTN was widely perceived among my interviewees as a government initiative, not as a joint proposal with the Mexican émigrés in the UK, and the *Brains'* perception of an absence of real autonomy became clearer through the

accounts of the *Officials*. Moreover, the *Brains'* enormous scepticism and critical position towards the Mexican government on issues like corruption, lack of Rule of Law, and excessive politicisation are serious inhibitors for collaborative initiatives to flourish, which require trust, transparency, or certainty. Such aspects have been underexplored both in diaspora policy studies (albeit some exceptions) and within the scientific diplomacy approach. As a result, the MTN has failed so far in building bridges between the *Brains,* the UK and Mexico, and this is partly why its outcomes are rather modest, particularly when considering the collaborative initiatives that were addressed in *Part one*.

The MTN needs, therefore, a new policy approach to face these shortcomings. To start, the perception of a state-led initiative calls for reorienting the MTN towards a wider initiative, organised under a more comprehensive model of collaboration, involving the government, industry, and academia. By splitting decision-making and management processes in thirds, the scope of the MTN would increase its chances of becoming a "community of communities of interest", by including a wider array of scientific, entrepreneurial, and government agencies. In their accounts, the *Brains* mentioned at least ten professional associations (of numerous engineering and scientific fields), research institutes, and different Conacyt research agencies that, to their eyes, could expand the collaborative initiatives on broader scientific/professional fields. On the other hand, a seed capital fund could be gathered from different private and public sources, and a more diverse Board from these three sectors could increase the chances of transparent use of resources. The lessons from the outstanding results achieved by the UK regarding scientific diplomacy and soft-power initiatives could offer important insights for Mexico. A more diverse organisation, with more professional associations involved, and more transparent process could increase the chances of de-politicisation, allay scepticism, and consequently offer more incentives to engage in distant collaborative initiatives, from skilled Mexican "Ambassadors" in the UK, and elsewhere.

On the other hand, institutions and regulations (section 6.8.6.) need to become more flexible and open, in order to foster collaborations with an international scope. In this regard, regulations also include Conacyt's SNI and scholarship scheme, relevant

scientific/professional networks in Mexico that need to be more active in reaching out their former grant-holders and relevant researchers abroad. Finally, it is important to take into consideration the challenges of nurturing teamwork, common interests and realistic expectations (section 6.8.7), and moreover, to take into consideration the challenges from the imbalances (section 6.8.8.), in order to think of collaborative possibilities with a sense of realism.

Under an improved policy design, the MTN could not only follow more effectively the paths of the *Brains* abroad, but could greatly contribute to build more bridges of communication and mutual understanding between Mexican institutions and Mexican skilled émigrés worldwide. However, more realism and closer attention to political concerns, and issues of trust and legitimacy must also be considered.

Chapter 7

Conclusions

This thesis presented the first in-depth case study of the Mexican skilled migration to the UK. It was mainly based on qualitative interviews about the experience of 36 Mexican scientists and engineers, of different age groups and gender, who left Mexico for a varying number of years and currently work in academia or the private sector in the UK. Through these semi-structured, qualitative interviews, my attempt was to learn about the people behind flat statistical accounts, and to contribute to filling gaps in our knowledge about the paths, motivations, work, achievements, and actual/potential long-distance contributions of a migratory group that has been underexplored to date. From these insights, I explored the role of diaspora policies and long-distance collaboration to mitigate the negative effects of skilled migration. To achieve these goals, I used three main topics to explore the migrant experience: transnationalism and identity, professional experience, and collaboration at a distance.

In this final chapter, I present the main findings and contributions of this study, structured around these topics.

A transnational perspective

One of the questions that this study addressed was related to exploring the patterns and differences in the decisions of Mexican scientists and engineers to leave Mexico, as well as to remain in the UK. As has been argued, the constructivist character of this study allowed an understanding of skilled migration as a social phenomenon, where the paths of my interviewees revealed frequent travels between both countries. These interviewees' paths, however, also manifested a degree of uncertainty about the temporality of stay. In this context, transnationalism emerged as a pertinent conceptual framework for my analysis, in order to provide a better understanding of how and why these current (and often changing) mobility patterns occur.

In this regard, education was found as an element of paramount significance for explaining Mexican skilled migration to the UK. As observed in chapter 4 (section 4.2), before leaving Mexico, the vast majority of my interviewees had already experienced mobility before. Within these initial experiences, one-third left their hometown to enrol in different higher education institutions across Mexico. In these cases, the study showed how skilled migration is, in many ways, an issue of concentration: in Mexico, just four "student cities" attracted almost all of the *Brains*, which suggests that before a brain drain overseas occurs, an *internal* brain drain takes place within the country. Moreover, the desire to study not only encourages mobility within Mexico, but as the empirical evidence showed, postgraduate academic programmes were found as the most relevant "pull" factor to the UK, in more than two-thirds of the cases (a total of 29, of which 27 enrolled in British universities). The *Brains'* intentions to explore new horizons were mostly facilitated by the Conacyt scholarship programme, and the choice of the UK as destination was partly influenced by the country's strategic promotion of its education system, culture, language and lifestyle. The British soft power, considered the most important in the world (McClory 2015), does seem to make a difference as for talent attraction.

The émigrés' decisions to leave appeared as a continuum of personal, professional, and social experiences. Through the lens of transnationalism, it was possible to observe how the *Brains'* exposure to different societies, cultures, living conditions, and even gastronomy or weather contributes to the creation of new subjectivities. In chapter 4, interviews revealed that notions of identity and belonging (symbolically represented as *Mexicanhood*) are challenged by the receiving context, where "anchoring" factors emerge and develop progressively within the lives of the *Brains*. By contrast to traditional connotations of "push" and "pull" factors from neo-classical economic approaches, I suggested this term to observe how postgraduate education and professional experiences in the UK are internalised by the émigrés, where the decisions to remain are shaped and taken *during* the migration experience, and not necessarily *before* migration takes place, as earlier rational choice perspectives have suggested (chapter 4, section 4.5). Personal relationships, for instance, are fundamental elements experienced by the *Brains* during the course of their

postgraduate studies that cannot be explained as “push” or “pull” factors, despite their enormous relevance for understanding the decisions to remain: in more than half of the cases, the *Brains* met and fell in love with other *Brains* (that is, also highly-skilled partners) during their postgraduate studies. Along with the pursuit of professional experience (either further studies or work opportunities), the presence of foreign partners is a fundamental “anchoring” factor influencing the *Brains'* decisions to prolong their stay in the UK. I say prolong because, as chapter 4 showed (section 4.5) in the majority of cases, the *Brains* claimed not to know whether or not their stay is permanent. This uncertainty in the decisions to remain challenges traditional assumptions in much of the brain drain literature, where migration long appeared as a permanent election. As the perspective of transnationalism notes, mobility is an important alternative to migration in late modernity.

On the other hand, transnationalism also opened up a way to observe constant reflexive processes among my interviewees, which involved them debating between their *past* and *actual* lives, and making frequent comparisons between Mexico and the UK. Chapter 4 (section 4.1) showed that my sample of interviewees is comprised of a relatively diverse group, but after analysing their life chronologies, an upper socioeconomic status component could be identified as an overarching condition of these émigrés. As previous findings on Mexican skilled migration have noted (Castaños Lomnitz 2004; Tigau 2013), the *Brains* gather together a series of characteristics that indeed portray them as members of a privileged group, such as their tertiary education schooling, their ability to speak English proficiently, their access to information on scholarships and postgraduate programmes abroad, or their ability to cross the Atlantic Ocean and afford, through different means, the living costs in a country as expensive as the UK.

This privileged socioeconomic status is frequently overlooked in the brain drain debate, despite its relevance for assessing how the lives of skilled émigrés were in their countries of origin, and what their lives are like in their receiving countries. For this reason, an important contribution of this study consisted in suggesting that living standards in both countries can actually be similar for these ‘elites of globalisation’ (Tigau 2013), or ´rich immigrants´ (Vailati and Rial 2016). In the case of Mexico,

inequalities in wealth and income distribution, additional compensations in wages, and a better Purchasing Power Parity (a term used to measure what the monies of different countries can buy) were identified as important elements to consider in the *Brains'* privileged past lives (chapter 4, section 4.9), and allow a deeper understanding of the conditions by which they are able to make choices. As Huppaz, Hawkins and Matthews (2016) discussed, social class continues to be a traditional factor in the shaping of identity, and has a significant effect in informing the life chances of individuals. These Mexican skilled émigrés are able to choose to leave the country, and moreover, they are able to choose *not to go* to the U.S. and leave for the UK instead, more than 5,000 miles away from home.

Within these reflexivity processes between past and actual life, another key finding was noted: contrary to a one-way depiction of migration as means to achieve a "better life" –as the brain drain narrative often suggests—, the empirical evidence showed that, for a vast majority of the *Brains*, life in the UK is not "better", but only "different" (chapter 4, sections 4.6 to 4.9). Many conditions in the UK are highly appreciated in their everyday lives, particularly those aspects where Mexico is lacking, such as security and the Rule of Law; access to public services (transport, health or education); a more equal, cosmopolitan and meritocratic society; a healthier environment; and a more stable political landscape. However, the decisions to leave also entail harsh sacrifices, and my interviewees constantly weighed numerous aspects of their past lives, like the Mexican culture and traditions, the weather, the gastronomy, the facilities to socialise, and, above all, the family and long-time friends they left behind. These aspects are profoundly influential in the shaping of a transnational identity within the *Brains*, where attachment to their *Mexicanhood* coexists with an inevitable alienation through the passage of time and physical distance.

The prevalence of emotional and personal ties with Mexico demonstrated that skilled émigrés are not *entirely gone*: 27 of the 36 *Brains* claimed to travel at least once per year to Mexico, and almost all maintain constant communication with relatives and friends (chapter 4, section 4.13). Within these connections, the interviewees' reflexivity processes also showed a mixture of feelings towards the country, involving nostalgia, sorrow, and concern about their hometowns and relatives. At a distance,

perceptions of an aggravated social and political landscape in Mexico beget widespread concerns among the *Brains*, as problems related to criminality, insecurity, corruption, political instability, violence and human rights are serious inhibitors to an eventual return, but at the same time, these feelings were frequently accompanied by a sense of commitment to get involved in Mexican affairs from the UK.

Opening pathways

The transnational perspective paved the way for addressing the professional experience of the *Brains* in the UK in chapter 5, motivated by my interest in investigating what happens once skilled émigrés are recruited in the labour market of their receiving country, either in academia or the private sector (conducting research and non-research related activities). In their condition as skilled workforce in the UK, a fundamental question that this study set out was to find out what my interviewees thought about the concept of the brain drain, and from their experience as "drained brains", to draw on some of the key elements to consider in the contemporary definition of skilled migration.

During the interviews, most of the *Brains* showed awareness about the negative implications of their departure. These have already been studied by the brain drain literature, particularly regarding their physical absence in Mexico, the loss of investments in their training, and the loss of contact with them. At the same time, however, they outlined a series of reasons that contribute to our understanding of why skilled migration takes place (chapter 5, section 5.1). Firstly, professional opportunities were mentioned as fundamental means for talent attraction. In this aspect, there is not only an issue of the number of opportunities –commonly referred as one of the main motivations to leave the country of origin, or to remain abroad—, but perhaps more important, on the *quality* of such opportunities. To the eyes of the *Brains*, the quality of professional opportunities in the UK is higher than in Mexico, and they have chosen to take them. These decisions point to what Shapin (2008) called 'moral equivalence', emphasising that scientists and engineers are human too, and not the possessors of some kind of moral superiority. From an STS perspective, the 'moral equivalence' of scientists has been highly relevant in explaining the realities of modern

science (to portray science 'as it is'), where its main actors are subject to the same desires, wants and drives as anyone else, as Seaborg (1966 [1955]) noted. I found this notion from STS as a useful analytical tool to explain, with a greater focus on the *Brains* as individuals, how the set of choices and reasons behind their decisions to leave or to remain abroad are deeply influenced by professional expectations and self-fulfilment. The 'moral equivalence' of scientists and engineers is therefore a concept of great explanatory potential that can contribute to expanding our knowledge of how decision-processes regarding skilled migration take place. As discussed in chapter 2 (section 2.4), migration studies have predominantly focused on skilled émigrés *once they are already skilled*, and *once they have already migrated*. STS however, offers a relevant conceptual framework to follow scientists and engineers and to study the particularities of their professional and wider goals and motivations.

Within these professional goals and motivations, the pursuit of a global career and a universalist notion of science were commonly mentioned by my interviewees. In this regard, the STS literature has referred to this transformation in the vocation of scientists and engineers, and considers them as 'free agents' (Wagner 2008) in late modernity, where they follow their careers and professional interests, wherever those may lead. This is why, for Wagner (ibid.), policy-makers cannot take for granted an allegiance of the Brains towards their countries of origin over their own careers. These interactions between transnationalism, *Mexicanhood*, moral equivalence and scientific vocation are complexities that need to be considered as processes with significant effects in the discussion of diaspora-engagement policies. Despite being notions focused on the scientific endeavour, many of my interviewees working in the private sector (conducting non-research activities) manifested similar rationalities. As was noted in the Introduction chapter of this study, for Shapin (2008) both the academic and the corporate worlds seem to converge in a growing number of issues: a permanent interest in recruiting talent by offering diverse work opportunities is certainly one of them.

Another discussion to consider in the contemporary brain drain debate is related to the issue of how labour markets operate in countries with different levels of development (such as Mexico and the UK). The anecdotes told by the *Brains* (in

chapter 5, section 5.1) confirmed that despite their ability to make choices, skilled émigrés are not 'free-floating individuals', but are immersed in institutional contexts, as Sontag (2016) noted in the case of start-up founders in Switzerland. From this perspective, choices to leave Mexico and to remain in the UK are greatly influenced by the capacities of labour markets in both countries for the highly-skilled. As the *Brains* noted, the efforts to train human capital in Mexico do not seem to be equally complemented by an extensive effort to recruit and make use of its skilled personnel available. With no clear articulation between training and recruiting strategies, this study suggests that Mexico is falling behind in becoming a more competitive pole for attracting talent (local and foreign). Common concerns expressed by the *Brains* pointed to an oversupply of human capital in Mexico, leaving skilled migration as one of the few alternatives available; the other is to dedicate themselves to other activities different to their training (hence a job or skills devaluation), with a consequent brain waste as a potential result. If, as has been said, professional motivations are highly relevant within the *Brains´* decision-making processes, it is therefore possible to observe why labour markets in developed economies may act as powerful 'migration-facilitating' mechanisms, as De Haas (2010) noted.

The experience of these "drained brains" allowed an insight into important features of the dynamics of the British labour market, where scientific institutions, transnational corporations, IT companies, and other research centres with a global reach can "outsource" part of their activities to countries with cheaper labour. On this point, a fundamental issue for the contemporary debate on skilled migration and the brain drain can be set out: from a counterfactual perspective (i.e. *what would happen if the Brains did stay in Mexico?*); "outsourced" skilled labour shows that, due to the capabilities of these transnational corporations and institutions to mobilise financial resources, human capital and knowledge across borders, it is possible to suggest that even if skilled migration did not take place, these corporations and institutions would still be able to concentrate the gross benefits. For this reason, the analysis of how the labour markets in Mexico and the UK operate posits additional complexities, as it not only involves the issue of retaining talent, but more importantly, of the kind of activities that are performed and the distribution of the gross benefits from such

activities. The Brains' anecdotes thus highlight "outsourced" skilled labour as an element to reflect on: on the one hand it may appear as an opportunity for building capacities in developing countries, but on the other it may be a more modern face of the world-systems theory, where peripheral countries continue to work in secondary tasks assigned by central countries in the global North, as discussed in chapters 2 and 5 (sections 2.2.3 and 5.1.3).

From these insights into the contemporary elements of skilled migration, the second part of chapter 5 (sections 5.2 and 5.3) addressed the *Brains'* professional activities in the UK, with the goal of advancing our knowledge about the work, achievements and contributions of the Mexican skilled diaspora in their receiving context. In this discussion, an important contribution of this study is related to the comparisons made by the *Brains* regarding their professional/scientific fields, which revealed important asymmetries between Mexico and the UK. These asymmetries were identified in this study as 'imbalances', taken from Portes' (1976) concept to explain distortions between the supply of professionals produced by the educational system of a society, and the internal demand for their services. Even though these differentials in scientific and professional capacities between central and peripheral countries are not new in the brain drain literature, the STS perspective and the qualitative approach used in this study allowed a deeper understanding of their particularities and implications.

For the vast majority of my interviewees, their professional/scientific field is more developed in the UK. This study found six main imbalances (chapter 5, sections 5.3.1 to 5.3.6) as the constituents of this perception. The first imbalance (*budgets, funding and investment*) was widely mentioned as a serious component influencing the development (and attractiveness) of scientific fields, where the British science policy includes a recent ring-fencing strategy to secure part of the funds for R&D, which has allowed stability and longer-term views at times of political and economic turbulence in the UK (Reid 2014). As this study showed, the level of budgets has implications not only for specific research projects, but also for the income of scientists and research centres.

The second imbalance (*Infrastructure and equipment*) revealed great differentials in scientific infrastructures (particularly regarding Big Science projects) between the UK and Mexico, but perhaps more important, the *Brains'* anecdotes revealed how these differentials do not only include equipment, but also include how the UK generates proper conditions for science to operate, particularly by acquiring research materials (such as reagents) in a timely manner. Infrastructure and equipment have thus significant effects on scientific productivity and quality.

The third imbalance (*Research, development and design activities*) were identified as one of the most important incentives within the *Brains'* career-decisions. This imbalance is particularly relevant, as none of my interviewees claimed that Mexico was superior in any of the *Brains'* fields. As observed in the cases of researchers and workers in mining, automotive and motorsport, or aerospace industries in the UK, the labour market in this country is largely based on developing know-how activities, whereas in Mexico the main focus is on manufacture, which is less attractive for the *Brains'* interests.

The fourth imbalance identified, regarding *Networks, communities of interest, and invisible colleges* deserves particular consideration. Networks have been widely studied in the academic literature. However, by focusing on the perspective of *science in the making*, STS is more illustrative of how such networks operate. The concepts of 'communities of interest' (Latour 1987) and 'invisible colleges' (Crane 1972; Wagner 2008) were used to conceive knowledge production as the result of human activity, particularly created and nurtured by scientists and engineers. On the one hand, invisible colleges in academia were mainly associated with competitive, well-equipped, and international research groups, with publications and international visibility. In the private sector, they were mainly characterised by working staff with relevant academic backgrounds and international expertise, as well as a cosmopolitan component. Instead of talking about networks (as migration studies commonly do), I chose these concepts from STS to depict the interconnected character of science more clearly. Here, invisible colleges (or the formal and informal associations of scientists and engineers) do not work or make decisions on their own, but they do it within broader communities of interest comprised of numerous stakeholders (politicians, policy-

makers, businessmen/women, entrepreneurs, academic staff, or civil society) that altogether shape scientific and professional ecosystems. Because of their interconnected character, the identification of the interest of skilled émigrés to become active members of these invisible colleges and communities of interest is considered as one of the most important findings of this study, due to the direct effects of such "membership" on work opportunities and mobility. Enriched by the perspective of invisible colleges and communities of interest, the role of networks was therefore a fundamental analytical tool for guiding this research, due to their relevance for influencing migration decisions at different levels, both as "pull" and "anchoring" factors.

The fifth imbalance (*triple helix collaborations*) is closely related to the existence of communities of interest, and focuses on how such communities interact. In the UK, sustained policy efforts to spark intensive collaborative schemes between business and academia have greatly contributed to the country's predominant position as a knowledge-based economy. By contrast, Mexico is more characterised by a 'statist regime' of triple helix collaborations (Ranga and Etzkowitz 2013), where the industry and academia are more limited to initiate and develop closer interactions. The *Brains* working in the aerospace industry offered important accounts about the relevance of the British collaboration model for the development of their fields. Finally, the sixth imbalance (*Underlying working conditions*) addressed non-professional elements by which the British labour market provides a suitable environment for skilled individuals to pursue opportunities and develop as professionals.

Altogether, imbalances (and the perception of imbalances) are key for explaining the levels of professional fulfilment that the *Brains* enjoy in the UK, where they have found better conditions to work and develop as professionals. Imbalances are then closely related to the perception of quality of opportunities stressed by the *Brains* in the interviews, and provide insight into *why skilled migration happens*, and moreover, suggest why skilled migration is a phenomenon that is *here to stay*, not only because of policies to attract/retain skilled personnel in advanced economies, but primarily because of the preferences of the *Brains* themselves to work in these more privileged spaces.

From my point of view, another important lesson from these imbalances is related to the level of harmonisation and articulation that is needed in a knowledge-based economy, like the UK, where multiple connections can be envisaged: *development of scientific/professional fields need money; part of the budget for science is ring-fenced; money buys equipment; equipment allows for scientific productivity; R&D activities are widely done in "triple-helix" collaborations; invisible colleges work at these facilities; and communities of interest are created by the sum of invisible colleges, artefacts, and other stakeholders.* However, as was discussed in chapter 5 (section 5.3.2), most of these improvements in the UK took place over the last two decades, motivated by different policy documents and white papers. Altogether, these imbalances allowed observation of how virtuous circles can be nurtured from more clearly structured agendas in scientific, education, economic or migratory policy.

Due to the weight and relevance of these virtuous circles, another issue to consider within the contemporary brain drain debate has to do with the value of the "membership" of the *Brains* to these privileged sites of knowledge production, innovation and/or professional development. It can be said that an eventual return to Mexico would probably affect their access to more developed scientific/professional fields (and hence, to invisible colleges and communities of interest of global reach, budgets and investments, infrastructures, equipment, collaborations, or R&D activities). As I stated in the introductory chapter, skilled émigrés DO make a difference, but the imbalances identified by the interviewees also show that émigrés become more or less 'powerful' or 'innovational' depending on the conditions surrounding them, as Davenport (2004) argued. In a similar vein, the migrant experience showed how skilled émigrés are rapidly exposed to these developments in professional/scientific fields during their postgraduate studies, and towards the end of their degree they acquire new skills, which are frequently above the level of scientific or professional development available in Mexico. For this reason, the extent of the "drain" of skilled individuals needs further consideration in the contemporary brain drain debate, particularly when less developed countries lack sufficient high-quality opportunities, or when the skills of their *Brains* exceeds their actual capacities.

For these reasons, the accounts of the *Brains* suggest that contemporary skilled migration is in many ways the 'natural result' (in the words used by a good number of them) of how the world is organised in modernity, where the competition for talent is a component of paramount significance. Under current conditions, elements like outstanding capacities in labour markets, or authoritative sites for knowledge production, are only available in certain countries or regions, as different authors have discussed (Latour 1987; Shrum and Shenhav 1995; Vessuri 2008; Rodríguez Medina (2013), and in many ways, the 'Matthew effect' (Merton 1968) is still manifested in the attraction and concentration of *Brains* to leading research centres and corporations in the UK (chapter 2, section 2.4).

Despite the harsh realities from these imbalances, the accounts of the *Brains* also revealed valuable evidence that was unknown until now, regarding their fields of specialisation, occupations, achievements and contributions to Britain's leading role in the global economy. This visibility of the professional paths of the *Brains* in the UK allowed a deeper reflection on *what can be done* about skilled migration in late modernity, as émigrés can also be of great value for Mexico. For this reason, the thesis analysed diaspora-engagement policies and the notion of scientific diplomacy as means for building bridges with the Mexican skilled diaspora.

Building bridges

Chapter 6 built on from key findings in the previous discussions regarding the prevailing *Mexicanhood* in most of the *Brains* (despite time and physical distance), or the value of their "membership" to the British labour market to explore the extent to which collaboration at a distance (in the form of diaspora policies) can be feasible alternatives to mitigate the negative effects of skilled migration. In principle, this study found that more than half of the *Brains* are or have been engaged in different kinds of collaborations with Mexico from the UK (chapter 6, sections 6.1 to 6.6). The *Brains'* "membership" of the British scientific/professional landscape has allowed them to build bridges with Mexico from the UK, in different ways and with different effects. From the perspective of scientific diplomacy, the evidence showed how these *Brains*

have effectively become “Ambassadors” to bring two relatively distant nations closer towards the achievement of valuable scientific/professional goals.

Most of the collaborations found have been carried out by researchers in academia: *teacher-apprentice* and *peer-similar* collaborations have shown how, from these communities, the *Brains* have been able to access British/European research grants to recruit Mexican students (either through postgraduate programmes, or temporary visits), engage in joint research and publications with their peers in Mexico, and enhance the internationalisation of Mexican institutions. *Capacity-building* activities, on the other hand, were mainly addressed by senior researchers (professors), who are making use of their connections and access to scientific capacities and institutions in the UK to conduct research on unexplored topics in Mexico, to open the gates of British postgraduate programmes to Mexican students from lower socioeconomic backgrounds, or to transfer equipment, knowledge and techniques. The contributions from these senior researchers (who left Mexico a long time ago) suggest that willingness to collaborate can indeed transcend the passage of time and physical distance.

On the other hand, the possibilities of ICTs have allowed the increase of *virtual collaborations*. In academia, such collaborations represent new opportunities and incentives to collaborate: Conacyt, for example, now allows the possibility for the *Brains* to become members of the National Researchers System (SNI) from abroad, so they can relate better with their peers in Mexico. In this new arrangement, the *Brains* can now foster scientific collaborations, suggest research topics to explore, and contribute with peer-reviews of research papers and grant applications. Another activity mentioned in interviews was online-lecturing, where the *Brains* can contribute more actively in highly-skilled formation from remote locations.

Even though the *Brains* conducting non-research related activities were found to have considerably less long-distance collaborations, some of them claimed to make regular use of their expertise about the business environment in the UK and Mexico. Their transnational identity and knowledge on the British landscape allowed them to identify business opportunities and engage in commercial exchanges with Mexican

companies. These collaborations offer important alternatives for increasing the exchange of two relatively distant markets, with the *Brains* as key entrepreneurs.

The final type of collaboration identified in my interviews had to do with social entrepreneurship and political activism. Even though this study was mainly interested in scientific and professional collaborations, the widespread perception of Mexico's aggravated social landscape among the *Brains* constituted aspects of their accounts that deserved particular attention. As part of a transnational behaviour, most of the skilled émigrés remain informed on the social and political situation in Mexico, with common associations between Mexico's problems (corruption, lack of rule of Law, violence, insecurity) and the government's responsibility. This perception has motivated some of them to take action in political activism or social entrepreneurship projects. This is relevant, as it seems to confirm that these privileged transmigrants can undermine the authority of the government beyond its borders, as noted by Smith (1994) and Weeks and Weeks (2013), and this can represent important challenges for state-led transnational initiatives, like diaspora policies.

Altogether, existing/past collaborative initiatives with Mexico from the UK provided bottom-up evidence about a significant engagement of skilled émigrés with different Mexican affairs. Despite the passage of time and geographical distance, these long-distance collaborative initiatives suggest that a contemporary understanding of the brain drain –involving a transnational perspective, the *Brains'* choices and decisions, their access to communities of interest and invisible colleges, the role of scientific diplomacy, and their immersion in the skilled labour market in the UK— can contribute to mitigate part of the negative aspects of skilled migration. Consequently, this allows *Brains* to make use of collaboration at a distance as means to achieve a more balanced exchange between Mexico and the UK. However, it was also significant that none of these initiatives took place because of Mexico's diaspora-engagement policy, the Mexican Talent Network, which points to different challenges for diaspora policies and for collaboration at a distance as a whole.

The second part of chapter 6 focused on these two issues, the design and current status of the MTN on the one hand, and on the main causes for its limited involvement

in tackling existing collaborative initiatives on the other. For this part, (sections 6.7 and 6.8), the anecdotes of the *Brains* were complemented by the views of four *Officials*, whose work and responsibilities had some level of interaction with the MTN. In general, this study found that Mexico has not been absent from the changes to the brain drain paradigm. In many ways, important steps have been taken towards a better policy approach to skilled migration, including the MTN as a global network to reach skilled émigrés (which as of 2015 already had 34 chapters in several countries), more flexible regulations for Conacyt's scholarship programme for studying abroad, or recent schemes for allowing Mexican researchers abroad to become members of the SNI (the most important network of researchers in Mexico) from afar. In the case of the MTN-UK, networking events promote more of a nexus between skilled émigrés in the UK, and relevant calls from Mexico (research, news, contests, events, or grant applications) are commonly disseminated through its communication channels.

As the empirical evidence showed, however, the success of the MTN in mobilising the diaspora under new paradigms has not resulted in significant collaborative projects so far, and the *Brains'* and *Officials'* views revealed several reasons that may be hindering the role of the MTN. On the one hand, the MTN lacks essential policy instruments to engage with the Mexican émigrés in the UK. Shortcomings mentioned included insufficient institutional and financial support, a deficient management scheme (given that the MTN-UK has no full-time staff for arranging collaborations), and a limited membership (despite being one of the largest chapters in the world, as of 2015 the MTN-UK only had around 350 members, a rather modest sample of the estimated 8,470 skilled Mexicans in the UK). But perhaps more important, one the main issues of the MTN is related to legitimacy, an issue that has been overlooked in studies on diaspora engagement (Kuznetsov 2006; Rannveig Agunias 2009) but that has been identified in previous diaspora policy studies in Latin American contexts (Weeks and Weeks 2013; Boccagni 2014). To the eyes of the *Brains*, the MTN is essentially a government initiative without real autonomy, and is highly politicised. Due to their enormous scepticism and widespread criticism towards the Mexican government, collaborative initiatives face difficult challenges to flourish under the MTN, as they require trust, transparency, or certainty. As a result, the MTN has failed so far in

becoming an active promoter of collaborations. This is partly why its outcomes are rather modest, particularly when comparing them to existing/previous collaborative initiatives led by the *Brains*.

As Wagner (2008) has noted, modern science (and I would add, the corporate world) is indeed a social process that is international in scope and cannot be effectively controlled by governments. State-led transnational initiatives therefore face numerous challenges for establishing systematic and productive long-distance collaborative initiatives. Based on the case of the MTN, this study outlined eight challenges and recommendations for diaspora-engagement policies: Firstly, *information matters* (section 6.8.1). General information on skilled émigrés is needed, particularly concerning their number, location, fields of expertise, ways to be contacted, and research/professional interests. Nowadays, Big Data and Data scientists offer important possibilities to manage such amounts of information, but numerous security controls and data protection regulations would be essential, particularly in view of the widespread scepticism towards the government. Secondly, *visibility and recognition matter* (section 6.8.2). Establishing collaborations should aim to bring out of the shadows a neglected migratory group in Mexico, such as the highly-skilled in the UK and elsewhere. So far, the vast flows of unskilled émigrés to the U.S. gather all the attention and priority in the migration policy agenda (which is understandable, in view of its size and generally poor socioeconomic backgrounds), but the relevance of skilled migration is unique, and its contributions can bring several advancements in different fields of knowledge. This study has demonstrated many valuable examples of the *Brains'* professional experience and contributions, where a growing recognition and visibility is key to expanding collaborative initiatives, and to building more bridges between skilled Mexicans in the country and abroad.

Thirdly, *policy matters* (section 6.8.3). As noted earlier, the anecdotes by the *Officials* revealed that the MTN lacks a proper organisational structure, particularly regarding human and financial resources, and no seed capital is given by the Mexican government to start collaborative projects. In the MTN headquarters in Mexico (based at the Ministry of Foreign Affairs) similar problems concerning limited personnel and funds were found. In addition, there are no scientific coordinators in the most relevant

Mexican Embassies or Consulates. As a result, there is very limited monitoring and operational workforce to actively seek and encourage collaborations with the skilled diaspora. In these conditions, scientific diplomacy cannot operate correctly. Fourthly, *projects matter* (section 6.8.4). Even though the majority of the *Brains* claimed to be interested in further collaborating (or to start a collaboration) with Mexico from the UK, issues regarding *how to collaborate* soon emerged, particularly regarding what kind of projects are needed, roles and inputs, timelines, people involved, financial resources, and importantly, de-politicised goals. Besides the relatively modest number of members in the MTN (of 350), the President of the MTN-UK also referred to their low levels of active involvement, which also suggests a lack of incentives and conditions to materialise projects.

Fifthly, *politics matters* (section 6.8.5). As has been noted, my interviewees manifested a widespread scepticism about the government conduct and performance. These views seem to clash with the core objective of diaspora policies, which seek to attract skilled émigrés into long-distance collaborations. Additionally, previous studies on diaspora policies showed (in chapter 2, section 2.5.3) how many of these initiatives have predominantly been characterised as being centralised, top-down initiatives, which in many ways reflect the governments' intention to strategically control collaborations, in order to avoid international scrutiny. Without mutual trust and a lack of legitimacy, the MTN faces serious challenges, and these issues are frequently overlooked by scientific diplomacy. For this reason, this study recommends that more actors get involved, from an exclusively government-led initiative into a sort of triple helix collaborative model that includes a more active participation of industry and academia, through an Executive Board. By splitting decision-making, funding and management responsibilities, the MTN would increase its chances of becoming a "community of communities of interest" by including a wider array of scientific, entrepreneurial, and government agencies. As this study showed, a more autonomous diaspora-engagement policy is widely needed for increasing its legitimacy, and moreover, this increased scope would significantly contribute to offering more professional incentives, and in more diverse fields. At the same time, this new

institutional design could also seek and encourage collaborative projects according to the country´s specific development and productive needs.

Sixthly, *institutions and regulations matter* (section 6.8.6). Long-distance collaboration requires more comprehensive articulations at the institutional level, as well as more flexible regulations and an international scope. For researchers, online platforms and consultation forums can represent valuable alternatives for re-connecting researchers with Mexico through the Conacyt and other research agencies with former scholarship-holders, who may be more encouraged to participate by becoming members of the SNI abroad (which has an important curricular value). However, as of 2016, less than 700 Mexican researchers abroad were registered members of the SNI (50 of them in the UK), an extremely poor number considering the estimated number of the Mexican skilled diaspora, of more than 1 million Mexicans worldwide (Conacyt 2016; Delgado Wise et. al. 2015). Additionally, skilled émigrés doing both research and non-research activities noted the need of more openness of Mexican institutions to engage with their international peers. In this regard, scientific diplomacy also entail less paperwork and bureaucratic procedures. With a renewed scope, the MTN could boost its role as a facilitator for this endeavour.

Seventhly, *people matter* (section 6.8.7). As Day and Stilgoe (2009) noted, globalisation happens *because of people*, and the same applies to skilled migration and collaboration at a distance. Even from afar, researchers and professionals eventually need to meet, define roles and agree the terms of such collaborations. Cultural challenges, work methods and even group chemistry will be defining for successful collaborative projects. And eighthly, *imbalances matter* (section 6.8.8). The substantial differences between Mexican and British labour markets, and the general levels of development of scientific/professional fields can give origin to several tensions in collaborative agreements. On the Mexican side, the turbulences in political affairs and unsteady financial support for projects can present risks that their counterparts abroad may not be willing to take. On the British side, the commodification of specialised knowledge (involving copyrights, data protection regulations, patents, and strict privacy agreements) may limit the expectations and incentives. However, these

imbalances also offer a vast array of possibilities, if approached and used wisely, to benefit Mexico in many different areas of knowledge.

In the concluding remarks of many studies of the brain drain, well-intended suggestions are frequently made but rarely say how they can be accomplished (such as increasing the investments on R&D, or increasing the efforts to retain the *Brains* in the country). I want to try a slightly different perspective. Along with the challenges and suggestions for increasing long-distance collaborations noted above, the *Brains* also stressed other relatively simpler measures that could be met with the current institutional capacities of Mexico, which are worth mentioning: i. *Outline a protocol for reagents in customs.* This measures does not involve additional resources, but rather new regulations regarding the importation of scientific tools and substances that are essential for research, which would, in their view, increase scientific productivity (chapter 5, section 5.3.2); ii. *A user-friendly software platform* for the MTN, the SNI, and the scholars benefited by the Conacyt would enable more direct communication between the Mexican government, research institutions and industry with the skilled diaspora; and iii. *A ring-fencing model* to protect part of the science budget would increase the levels of certainty and government commitment to science and technology, as a message to the academic community that science matters in Mexico, and at the same time, to add political pressure to private corporations that are yet to increase their interest in innovation and investments on R&D and design activities (chapter 5, section 5.3.3).

In sum, this study does not suggest that collaboration at a distance is the key to revert the negative effects of skilled migration, or even less, to Mexican development. It does emphasise, however, that its potential and relevance is still overlooked, and in many ways undervalued. Besides the collaborations addressed in the study, additional scientific diplomacy initiatives, such as joint Mexican-British funds for scientific collaborations (mentioned in chapter 6, section 6.8.8) are evidence that there exist conditions for a wider exchange between the two countries. Without overlooking the negative implications of skilled migration on a massive scale, the migration of Mexican scientists and engineers can also provide benefits for both sending and receiving

countries, where, as we have seen, the capacities of the global North can also be used to the benefit of the global South.

With these insights in mind, a more balanced exchange between Mexico and the UK can be achieved in future years.

Contributions

This study has found relevant evidence from the personal and professional experiences of the Mexican *Brains* in the UK, which can inform the contemporary debate on skilled migration and the brain drain in different areas. The thematic organisation of the study –comprised of transnationalism, professional experience, and collaboration at a distance— offered new insights into many of the traditional assumptions of the brain drain, and also challenged, to a significant extent, the narrative of the permanent loss of skilled individuals, the loss of investment in human capital, and the loss of contact. Without overlooking the negative aspects of their physical absence in the country, this study has shown that it is possible to establish long-distance collaborative initiatives with the émigrés, where they can significantly contribute to build different capacities in Mexico.

More than the mere departure of the *Brains*, this thesis argues that the real "loss" of the *Brains* in modernity is more related to their lack of visibility, where there is limited knowledge in Mexico about the pathways, roles, specific locations, achievements and contributions of its skilled diaspora. It is important to bring these skilled émigrés (in the UK and elsewhere) out of the shadows, recognise their abilities, and be open to welcome their views. Additionally, whereas collaboration at a distance is happening in different areas of knowledge, the MTN has not so far represented an effective policy alterative to build bridges with the *Brains:* locate them, establish contact and provide incentives to engage them in long-distance collaborations. As a result (and in this thesis' own terms), the MTN is not perceived as a relevant community of interest by my interviewees, who find few incentives to become members, or to participate more actively. In this regard, this study argues that it is important for policy-makers to understand the relevance of skilled individuals' choices and preferences, the value of communities of interest, the existing imbalances between central and peripheral

countries, the role of legitimacy and politicisation in state-led transnational policies, and the challenges posed by long-distance collaborative initiatives.

In order to answer its research questions, this study aimed to establish closer relationships between STS and migration studies. Since 1972, Crane observed that different research areas had tendencies towards increasing relationships and receptivity to external ideas and influences. In this regard, STS offers important insights to achieve a wider understanding of the contemporary complexities of skilled migration and the brain drain. The on-going debate between vocation and moral equivalence (closely related to the discussions between what science 'is' or 'ought to be') is closely related to the reflexivity processes of scientists and engineers during their migration experience, who make decisions to leave and to remain abroad greatly influenced by them. Likewise, STS has studied the creation, interaction and operation of scientific networks. In this study, I used the notions of communities of interest and invisible colleges as a way to depict the networked character of modern science and the corporate world, where attraction, mobility and concentration of skilled individuals are of paramount significance to achieve scientific and professional developments. The constructivist STS perspective also allowed an original approach to the professional experience of the *Brains* in the UK, particularly facilitating a focus on the work they perform, and how they contribute to knowledge production in several fields.

At the same time, STS can also draw on some of the lessons from migration studies. The notions of 'moral equivalence' and other similar concepts –like Wagner's (2008) notion of 'free agents'— often give the impression that scientists decide to move with little regard for national identity or belonging. As this case study showed, however, skilled émigrés preserve their identities in many ways, albeit negotiated in their receiving contexts, and in general, have a commitment (at least in principle) to do something about their countries of origin at a distance. Besides the discussion of nationality as a significant issue, the *Brains'* concerns for their relatives and long-time friends are additional incentives to do so. On the other hand, the term of scientific diplomacy is a valuable framework to analyse current international diplomatic efforts, where science occupies a central role to assess global issues, but at the same time, the

empirical evidence revealed the limitations of the term, where more attention is needed to consider the thoughts and views of the émigrés more closely.

This case study can also offer valuable insights to inform other cases of Mexican skilled migration. The enormous size of Mexican skilled migration to the U.S. poses numerous challenges, and a smaller-scale case study, like the present one, can help to analyse with closer detail some of the complexities, differences, and transitions. In the same vein, this case study's findings can shed light in similar cases of skilled migration to the UK, particularly the Latin American region. As McIlwaine and Bunge (2016) note, Latin Americans are the second fastest-growing non-EU population in London, after the Chinese. In this regard, this study can offer insights to spark similar case studies (as well as to sensitise policy-makers) of other countries of the region. Given its growth, and the considerable numbers of skilled émigrés arriving to the UK every year, Latin American countries would do well in taking a closer look at skilled migration research and policy studies. The region shares many similarities, and skilled migration studies, such as this one, can contribute to find better alternatives to compete in more equal terms in knowledge-based economies (Oppenheimer 2010).

Limitations

In chapter 3 (section 3.7) I addressed a number of limitations to be considered. I am aware that my own experience as a highly-skilled, temporary migrant in the UK, and as a Mexican, are important elements influencing this research. Subjectivity, relativity, and truthfulness entail common limits within qualitative research that must be taken into consideration. I made a consistent effort to stay rigorous and methodical, prone to find counter-narratives, unsuspected findings, and also to share and confront my ideas with my supervisor, other researchers and PhD fellow students, in order to find gaps within my own assumptions (for instance, I initially thought that the *Brains'* lived better abroad, that they were gone *for good*, and that they did not contribute at all with the country at a distance). Thematic analysis, as explained by Braun and Clarke (2006), will also allow other researchers to evaluate this study, compare it and contrast it with similar research in the field. I believe that the findings in chapters 4 to 6 are supported by these approaches, and even though I did not aim for generalisation or

representativeness, it is my hope that this study can be useful to inform other similar studies in terms of similarities, differences, contrasts, or limitations, particularly regarding Mexican skilled migration in the world, and other cases of skilled migration of Latin Americans to the UK.

It is also important to highlight that this is not a primarily policy-oriented research. I took into consideration Yin's (2011) views on the risks when outlining calls for action, which may include a naïve rendering of the policy topics, or the over-simplification of complex phenomena, where its understanding require a thorough review of several disciplines and the development of both qualitative and quantitative approaches, elements which go far beyond the scope of this work. As for the policy perspective, the findings reported in chapter 6 do not intend to offer an overarching perspective on how the Mexican government is addressing long-distance collaborative initiatives with its skilled diaspora in the world. Many Mexican and British institutions may be well engaged in rich collaborations that are outside the scope of this research. My in-depth analysis on the issue of collaboration at a distance is limited to the accounts of the *Brains* and the *Officials*, with particular emphasis on the MTN-UK. However, as one of the largest networks of skilled Mexicans abroad, it does offer valuable insights on how the MTN is working, its policy design, its possibilities, shortcomings, and challenges for the near future.

Areas for future research

Numerous avenues are left for potential areas of future research. On the one hand, large-scale studies are needed to create a database, as comprehensive as possible, on the number of skilled Mexican émigrés abroad in order to assess the gravity of the brain drain in Mexico in greater detail. Existing figures (mostly by Tuirán and Ávila 2013, and Delgado Wise et.al. 2015) have portrayed a worrying figure of around 1 million Mexicans with at least a university degree abroad, most of them residing in the U.S. However, numerous questions about their location, occupations, and ties with Mexico remain. These studies need to integrate both quantitative and qualitative approaches; the first ones, to widen current estimations on numbers and statistics,

and the latter, to know more in-depth details about their occupations, achievements, and potential contributions at a distance.

On the other hand, scientific and professional collaborations are indeed complex phenomena that need special consideration. I made an effort to identify and group the main challenges, but it is clear that each field of knowledge has its own methods and logic to nurture collaborations. Further studies on how these collaborations work are needed to outline a more robust approach in order to increase their feasibility to mitigate the negative implications of skilled migration.

Finally, due to the time period covered by this study (from 2005, with the creation of the MTN, to 2015, when the last interview was done), recent political events of paramount importance for the future of skilled migration were left out of the scope of analysis. As I was writing this thesis, the referendum on Brexit in the UK and the Presidential Elections in the U.S. took place. For many of the reasons addressed in this study, these events are likely to have profound effects on skilled migration and talent attraction in the near future. Further studies can build on from some of my conclusions to outline possible scenarios for the future of skilled migration in these countries.

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This study is inspired by a personal voyage. During four years, I had the privilege to experience mobility first-hand, during my PhD programme. For personal and academic reasons, I experienced the process of going back-and-forth between Mexico and the UK during this time. Having the opportunity to work and study in London gave me a closer understanding of the *Brains*' stories, and even the experience of writing this thesis is transnational, as it was written in Tenerife (Spain), London (UK), Mexico City and Villahermosa (Mexico). This research hopes to contribute to the recognition of the skilled Mexican diaspora in the UK; to bring them out of the shadows in order to know in greater depth about their pathways, feelings, and contributions. My interviewees were willing to contribute because they thought their story was important enough to be shared. Hopefully, in time, we will be able to build more bridges with them, wherever they choose to go.

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APPENDIX I

The *Brains*

Nickname	Gender	Birth	Age group	Years abroad	Degree	Sector	University Mx
01. Mango	Male	Sinaloa	41-45	16+	PhD	Both	TEC
02. Salvador	Male	Mexico City	36-40	11-15	PhD	Academia	UNAM
03. Etienne	Male	Mexico City	41-45	2-5	MA	Academia	Iteso
04. Juan	Male	Puebla	31-35	11-15	PhD	Private	UDLA
05. Raul	Male	Veracruz	46-50	11-15	PhD	Both	UDLA
06. Starignus	Female	Puebla	31-35	2-5	PhD	Academia	UNAM
08. Thelonious	Male	Mexico City	36-40	11-15	MA	Private	Ibero
09. Emilio	Male	Puebla	31-35	6-10	BSc	Private	UDLA
10. Lola	Female	Mexico City	41-45	11-15	PhD	Private	ITAM
11. A	Female	Mexico City	41-45	11-15	PhD	Private	ITAM
12. Tzotzil	Male	Guanajuato	36-40	11-15	PhD	Academia	UDLA
13. Erasmus	Female	Mexico City	36-40	6-10	PhD	Academia	IPN
14. Rafa	Male	Yucatán	31-35	6-10	PhD	Academia	UAY
15. Puma	Male	Mexico City	55 +	16+	PhD	Academia	UNAM
16. Alejandro	Male	Mexico City	55 +	16+	PhD	Academia	UNAM
19. Paco	Male	Mexico City	31-35	6-10	PhD	Academia	UNAM
20. Chinos	Male	Mexico City	31-35	2-5	PhD	Private	ANAHUAC
21. Mariana	Female	Mexico City	31-35	6-10	MA	Private	TEC
22. Charantulo	Male	Sonora	36-40	11-15	PhD	Private	Uni Sonora
23. Quiquillo	Male	Mexico City	41-45	6-10	PhD	Academia	UNAM
24. Cris	Female	Mexico City	31-35	6-10	PhD	Academia	TEC
25. Javier	Male	Aguascalientes	31-35	2-5	MA	Private	TEC
27. UKMEX	Male	Mexico City	46-50	16+	PhD	Academia	UNAM
28. Max	Male	Sonora	31-35	2-5	MA	Private	TEC
29. Antonio	Male	Mexico City	41-45	2-5	MA	Private	IPADE
30. Rius	Male	Chiapas	31-35	6-10	BSc	Private	TEC
31. Gabriel	Male	State of Mexico	31-35	6-10	MA	Private	TEC
32. AGG	Female	Mexico City	36-40	11-15	PhD	Academia	UNAM
33. Beto	Male	Jalisco	36-40	6-10	PhD	Academia	Cinvestav
34. AR	Male	Jalisco	41-45	11-15	PhD	Academia	IPN
35. Victor	Male	Mexico City	46-50	16+	PhD	Academia	UNAM
36. JuanR	Male	Baja California	41-45	11-15	PhD	Private	UNAM
37. Juan Pablo	Male	Mexico City	41-45	11-15	MA	Private	TEC
38. Pinky	Female	Mexico City	36-40	11-15	PhD	Academia	Cinvestav
39. T	Female	Chihuahua	51-55	16+	PhD	Academia	IPN
40. DJC	Male	Mexico City	31-35	6-10	PhD	Academia	UNAM

APPENDIX II

Interview Schedule (translated to English)

Name: _____
Age: _____
Gender: _____
Alias: _____

Origins
1. What part of Mexico are you from?
2. Did you always live there, or have you lived in other parts of the country?
3. What is your professional background? (Why did you decide to study that?)

Arriving / living in the UK
4. How did you arrive to the UK?
5. How long have you lived here?
6. Why did you choose the UK and not the U.S., where most of the highly-skilled Mexicans go?
7. Did you have a Conacyt scholarship? (What happened when the scholarship ended? how did you get the discharge letter?)
8. Do you have a family / couple here?
9. Did your family / partner play any role in your decision to leave Mexico / to stay in the UK?
10. What do you think about living in the UK? Broadly speaking, how is your life in comparison to Mexico? Would you say it's better, or worse?

Working in the UK
11. When/how/why did you decide to stay?
12. …So, would you say then that the main reason for staying is professional, or personal?
13. What do you currently do for a living? (Are you enrolled in the SNI? ** researchers only)
14. What do you think about your monthly/annual pay? (compared to Mexico, is it better/worse?)
15. What is your migration status? Do you have a visa?
16. Did you have other options to work besides the UK?
17. What do you think about your work in the UK?
18. Do you know other Mexicans who work here?
19. Do you consider then that there is a large Mexican community in the UK?
20. What levels of schooling does your Mexican friends have?
21. Have you ever helped any other Mexican to come to the UK?

Knowledge/views on skilled migration
22. It's been ____ years since you left Mexico. What do you think about the country at a distance?

23. How do you keep in touch with Mexico (professionally/personally)?
24. How often do you travel to Mexico? (How many times have you gone in the last two years?)
25. Do you send money to Mexico? For what purposes?
26. What are your main reasons for traveling to Mexico? (Professional/personal)
27. Do you think your presence in the UK has any impact in Mexico? Is it positive or negative?
28. Have you ever heard of the brain drain? How would you define it? As a "drained brain", do you think it's positive or negative?
29. Do you know the current conditions of your field in Mexico? (Could you mention some key differences?)
30. What do you think is the difference between you and your peers in Mexico?
31. Do you consider that collaboration at a distance is possible in your field of work? Have you ever been engaged in some kind of collaboration with Mexico? (ask to explain)
32. Have you ever heard of the Mexican Talent Network? (explain if they say no)

Prospective questions

33. If the government of Mexico, or a relevant centre/business in your field contacted you to offer you some kind of collaboration related to your field of work, what would you think about it?
34. What factors would you consider necessary to be willing to engage in this kind of collaborative initiatives? (specify that they don't have to return, but to work from the UK)
35. In which field (s) do you think you could collaborate on a project? Why?
36. From your perspective, what should the government/centres/business do to strengthen your field of work?
37. Likewise, what do you think the government/centres/business should do to support Mexicans abroad?
38. In your personal and professional environment, what are your medium/long-term goals? Have you considered moving to another place abroad, or returning to Mexico?

Open questions (Mexicanhood)

39. Mexico is _____
40. I'm Mexican because _____
41. Do you think that you represent Mexico at a distance?

APPENDIX III

Participant Information Sheet

Name of PhD candidate: Tonatiuh Anzures

Project title: Mexican skilled migration in the UK

Research question: *What has been the experience of Mexican scientists and engineers in the UK, and what is the relevance of this experience for the contemporary policy debate on skilled migration and the brain drain in Mexico?*

This thesis explores highly-skilled migration and the brain drain from a bottom-up approach. Based on the case of Mexican scientists and engineers in the UK, my goal is to depict a contemporary portrait of the brain drain phenomenon from the perspective of human experience, life paths and chronologies. As a secondary objective, this study explores the Mexican Talent Network (MTN, Red de Talentos Mexicanos), its composition, goals, and achievements. With both elements (migrant experience and the MTN), this study aims to suggest ways and policy ideas for expanding collaboration through diaspora-engagement policies in future yeas.

Qualitative data collection processes:
Semi-structured qualitative interviews will be conducted with participants from 2 categories:
1. Mexican scientists/engineers living in the UK. The goal of these interviews is to collect both personal and professional information, as well as any and relevant data that contributes to the knowledge on the motivations of the highly-qualified Mexicans to leave their country to work and live abroad. Particularly, the interest of this part of my research is to understand participants' opinions on three main topics: i. Past/actual life in Mexico/the UK [How do scientists and engineers feel/think of Mexico at a distance?] ii. Knowledge and expertise [Where do they work? What do they think of Mexico professionally?] and iii. Collaboration from a distance [Is it possible to apply their expertise/work in Mexico? how do they think this can be done? Do they use the MTN?]

2. Mexican civil servants and people working at the MTN. The goal of these elite interviews is to collect the thoughts of civil servants whose work has some level of relation to the scientific migration phenomenon, or that have shown concern for the emigration of highly-qualified Mexicans. The specific interest of this part of my research is to contrast their views with the information provided by the Mexican expatriates, in order to analyse how the phenomenon is being conceptualised by the Mexican government and the MTN workers.

Maintaining your anonymity
At the beginning of the interview, I will provide you a Consent Form. Please fill it in before we can proceed with the interview schedule. All of the information you provide for this interview will be anonymised. Your personal information will also be protected in accordance with the UK's Data Protection Act.

Main Supervisor: Professor Brian Balmer
Secondary Supervisors: Professor Joe Cain & Dr. Jack Stilgoe

Sponsors: Conacyt Beca de Posgrado en el Extranjero; SEP Beca complementaria, 2012 & 2013.

Department of Science and Technology Studies

CONSENT FORM (SAMPLE)
PhD Research Project
MEXICAN SKILLED MIGRATION IN THE UK

Thank you for agreeing to participate in the interview. Please indicate Yes or No in the appropriate boxes to signify that you have understood and agree with the relevant following statements:

	Yes	No
I have read the interview information sheet and understand the information provided and my role as a participant.	☐	☐
I agree to participate in the study. Taking part will include being interviewed and audio/video recorded.	☐	☐
I have been given the opportunity to ask questions about the project.	☐	☐
I understand that my participation is entirely voluntary. I can withdraw from the study at any time and I do not need to have to give any reasons for why I no longer want to take part.	☐	☐
I understand that for my words to be removed from the PhD thesis I will need to withdraw before the 1st of November, 2015.	☐	☐
Use of the information I provide <u>for this project only</u>		
I understand my personal details such as phone number, address or email will not be revealed to people outside the project.	☐	☐
I understand that my words may be quoted in academic publications and other research outputs.	☐	☐
Use of the information I provide <u>beyond this project</u>		
I agree for the data I provide to be archived at the UK Data Archive in the form of a transcript. This document will preserve the confidentiality of the information.	☐	☐
So that the information you provide can be legally used:		
I agree to assign the copyright I hold in any materials related to this project to Tonatiuh Anzures.	☐	☐

_____	_____	_____
Name of Participant	Signature	Date
_____	_____	_____
Name of Researcher	Signature	Date

APPENDIX IV

Coding examples

Reasons to stay
- Couple-family
- Work opportunities
- "I haven't decided to stay"
- Post-doc
- Personal
- Since arrival (planned)
- Experience
- Lifestyle UK
- Violence MX
- Start from scratch

Field UK vs MX
- Development of topic/field
- Difference expats vs locals
- Budgets
- Infrastructure
- Manufacture vs Design
- Research groups, networks, comms of interest
- University-business coll
- Research
- Professionalism
- Balance work-life
- Job projection
- Work options
- Meritocracy
- Planning
- Trust
- Publications
- Work environment
- Transparency
- Quality
- Satisfaction
- Work from Home
- Bureaucracy

Networks
- Supervisor
- Boss
- Personal relationships

- Recruiters
- Researchers

Views on the brain drain
- Definition
- Impact in MX
- Positive/negative

Colaboration at a distance
- Policy
- How to engage in CAD
  - Factors for CAD to happen
  - English language limitations
- Actual/past/regular CAD initiatives
  - Researcher/student
  - Peer-to-peer
  - Infrastructure and capacities
  - Virtual
  - Business
  - Political social activism
  - Expos MX
  - Journals and magazines
  - In person conferences (Visiting MX)

Government
- Conacyt
  - Scholarships
  - SNI
- Support in your field
- Legitimacy
- Corruption
- Electoral use/ politicisation
- Lack of trust/ Scepticism
- Manipulation
- Inequalities and poverty
- "No ear for scientists"
- "The gov don't share data"