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Tolerance and Global Talents in East Asia or
How Google Could Save the East Asian Miracle

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Introduction

“We asked for workers, and human beings came” (Max Frisch)

East Asia has become the widely used synonym for rapid economic growth and transformation. The academic interest in explaining the speed and effectiveness of such an economic metamorphosis from a rural and underdeveloped to an advanced and high-technology region has been tremendous. Much has been published about success enabling factors such as a strong state, the close linkages between state, companies and civil servants, the role of Asian values and its implications for leading and mobilizing people more effectively or the processing of imports and the absorption of foreign technology. Japan's Nikkei Business Daily reported that according to an International Monetary Fund forecast, by 2014 the East Asian nominal GDP is expected to reach \$17.34 trillion, approaching the U.S.'s \$17.41 trillion (Letzing 2009, November 3). Extrapolating the current economic performance of all major economic regions to the future, draws a clear picture: East Asia will surpass the United States as the global powerhouse within the next years (Letzing 2009, November 3). It seems that the continuation of the East Asian Miracle is inevitable.

Not quite so. According to Richard Florida, Professor and Head of the Martin Prosperity Institute at the Rotman School of Management at the University of Toronto, the East Asian societies need to catch up on one essential feature for sustainable economic growth in an highly globalized world: *tolerance* (Florida 2010; Florida, Melander and Qian 2008:32). Without *tolerance* highly skilled and creative people who are a prerequisite for economic growth in any region of the world rather live and work at places where they can express themselves freely, pursue their desired lifestyle and just be themselves without feeling judged by society (Florida 2004:67-82). But this is not the whole story. Florida argues that only the dynamic and interdependent interplay between the three Ts of economic growth - *Tolerance*, *Talent* and *Technology* will generate, enhance and sustain economic development in a region (Florida 2004: 249-267). Referring to reknowned academics and Nobel Prize laureats such as Robert M. Solow, who proved a clear connection between technology and growth (Solow 1956:65-94), as well as Robert E. Lucas Jr. who showed that a high level of human capital corresponds to a high economic growth rate (Lucas 1988: 3-42), Florida identifies *tolerance* as the essential link between *technology* and *talent* (Florida 2007:66-93). A high level of tolerance in a society raises the ability of a place to attract talented people from various fields,

which in turn leads to the creation of more innovative technologies and finally results in economic growth in the long term. In Florida's concept of the *Creative Class*, he argues that today there is fierce global competition among advanced countries for talent. He labels this the *Creative Class*. Members of the *Creative Class* are the global workers who are in the fortunate position of being compensated monetarily for their creative input. (Florida 2005:4). Based on the assumption that human creativity is limitless, Florida claims that the key to economic growth is enabling and unleashing that potential. This requires an open culture, a culture that allows people to be themselves, approves various forms of family and human identity (Florida 2007:66-93). Basically, this is a culture in which any group of people independent from nationality, gender or sexual orientation can live, work, and study without being *discriminated against*.

Whereas the East Asian countries do well in the first two Ts of economic growth *technology* and *talent*, tolerance issues in general and discrimination issues in particular have been persistent in all three East Asian states. Japan and Korea¹ are on the forefront in the technology field with a fast advancing China² following closely. The whole region offers a population highly devoted to education, which consequently results in a vast pool of high level human capital on which the economy can draw. Looking at the great degree of homogeneity of East Asian countries' populations, which has long been praised as a major advantage in mobilizing people for meeting national economic goals, the disadvantage that can be seen in this is a lack of tolerance towards differing lifestyles, individuality and free self-expression, and even the inability to attract global talent. Frequent coverage in the media (Glionna 2009, February 24; Azad 2006; Jia 2007, March 8) about cases of discrimination against foreigners and women in international media supports this claim. According to Florida maintaining East Asia's innovative edge requires the region to start attracting the world's sharpest and most creative minds. To make this happen, the East Asian countries need to raise their tolerance level significantly (Florida 2010; Florida, Melander and Qian 2008:32).

Florida conducted extensive empirical research on capturing the Creative Class structure in the United States and extended his work into a cursory overview of the world's creative talent magnets. In his book "The Flight of the Creative Class" published in 2007, he presented the "Global Creative Index" (GCI), a ranking of the major 45 creative nations in the

¹ Korea refers to the Republic of Korea

² China refers to the People's Republic of China

world. Based on a number of different measures for each of the three Ts, the GCI placed Japan second behind Sweden but before the United States. Korea held 16th place while China ranked 36th (Florida 2007:274-278).

Acknowledging Florida's provision of an overview of the relative standing of East Asian countries' competitiveness relative to each other and globally, his ranking possesses no explanatory power. His model does not provide any insight into the institutional dynamics between tolerance, talent and technology, nor does it explain why Japan is ahead of Korea and China but behind first placed Sweden. Besides the explanatory weakness of Florida's basically reasonable approach, there are hardly any publications on tolerance in Japan, China and Korea, not to mention a comparative analysis on East Asia's tolerance level as a whole. To raise the explanatory power of Florida's Three Ts Model and provide the first comparative work on tolerance in East Asia is the aim of this work. Furthermore; in order to maintain and raise East Asia's ability to compete economically on a global scale, the need for a comprehensive analysis of the tolerance level in East Asian countries and its implications for economy and society is pressing. Inspired by Richard Florida's work that showed a clear connection between tolerance and a region's ability to attract global talent to the most successful high technology producing areas in the United States and assuming that a low diversity level in a country's population is an indicator for a low tolerance level in a society, I hypothesize for the East Asian region that ...

... due to the lack of tolerance in East Asian societies, global talents and highly qualified foreigners choose to live and work in more tolerant places, outside East Asia.

Based on the above hypothesis, a number of central research questions arise:

- *What is the definition of tolerance? How can tolerance be measured?*
- *What is the tolerance level in the major East Asian countries? How has it changed in the course over time?*
- *How is tolerance regionally distributed?*

- *Is there an East Asian pattern of tolerance?*
- *What is the definition of being highly qualified?*
- *What do the East Asian governments do to attract global talents?*
- *How many highly qualified foreigners live and work in East Asia? Are there enough talented people to sustain economic growth in a long run?*
- *Where do highly qualified foreigners who live and work in East Asia come from?*
- *Does the continuation of the "East Asian Miracle" depend on highly qualified foreigners?*
- *Is there a relation between the tolerance level of a society and a country's ability to attract global talent?*

Shedding light on these research questions and dis-/proving the hypothesis are the aims of this work. In doing so, a three step approach has been chosen:

The first chapter captures the analytical framework consisting of the central terms and definitions, a comprehensive discussion of Florida's Creative Class Theory and an alternative research design, which will allow us to capture changing tolerance levels in East Asian societies since 2004. After establishing the analytical framework and research design, the second chapter discusses the East Asian government's policies to attract global talent and measures tolerance in East Asian societies over time and by region. The third chapter provides on the basis of the generated findings in each country, a comparative analysis which points out the major differences and similarities between Japan, Korea, and China. Without further ado, we turn to the analytical framework.

1 Analytical Framework

1.1 Terms and Definitions

1.1.1 Tolerance, Society and Discrimination

Tolerance

The term *tolerance* is a relational term. Its appearance, history and impact derives from the effort to arrange relations among persons normatively (Schreiner 1997:446). According to Müller and Halder ...

“... tolerance describes the acceptance of others with different beliefs, behaviours and customs“ (Müller and Halder 1973:169)

In other words, tolerance is the acceptance of the equality of different individuals (Teichert 1996:316-318). The term tolerance can be found with no consistent meaning in the fields of law, political science, sociology, and philosophy. In each case tolerance stands in relation to ways and rules of handling conflicts in social systems (Teichert 1996: 316-318). In the political and societal sphere, tolerance is the answer of a closed society and its mandatory value system towards minorities with different convictions and beliefs which cannot be integrated into the ruling system (Müller and Halder 1973:169). Tolerance also protects people, whose opinions differ from those of the majority in society, from repression and is, thus, considered as a condition for humanity (Müller and Halder 1973:169). The modern constitutional state certifies tolerance as an indispensable political and social principle that defines discrimination as an unconstitutional action, requires equal rights, and obligates states to follow democratically agreed norms on proceedings and decisions (Benda 2001:2147-2148). The history of the term was determined considerably through the tense relationship between passive patience and active toleration, between the ability to endure suffering and the acceptance of others with their respective differences (Schreiner 1997:446).

From an analytical and philosophical perspective,³ tolerance stands for an attitude and experience which is only required in a conflict (Forst 2003:12). The remarkable quality of tolerance is that tolerance is not capable of solving the conflict but only of easing it. Conflicting belief systems, interests, and practices continue to exist but lose their destructive power. Tolerance claims that cooperation is possible despite dissent (Forst 2003:12). Tolerance is not just a specific demand in social conflicts but is itself the subject of controversies. Both in the past and in the present, the term has not only been obscure but raises emotional disputes. It is possible that one and the same policy or action can be viewed by a group of people as tolerant and by another as intolerant. The debate becomes even more intense when the role of tolerance is discussed. Some share the opinion that tolerance itself may not be a good thing to pursue in society. Whereas for some persons, tolerance is a virtue provided by God, which is demanded by reason, ethics, and wisdom, others view tolerance as a condescending, paternalistic, and potentially repressive act; for the one side, it is the expression of self-assurance and firmness of character, for the other, it is an attitude of insecurity and weakness; for the first side, it shows respect for others and appreciation for the different; for the other an attitude of indifference, ignorance and separation (Forst 2003:14). Throughout history conflicts have existed in which tolerance seemed to offer a solution. Nowadays, tolerance stands not only within societies but also between states and all kinds of regimes on the agenda. Governmental institutions and non governmental organizations alike debate how far tolerance should go.

To enhance the understanding of the term tolerance, Forst differentiates between two perspectives on tolerance: The first one views tolerance from a state theoretical or “vertical” perspective and the second one from a “horizontal” or intersubjective perspective. In the former, tolerance is seen as a political code of practice and a form of state policy to maintain peace, law and order, and stability. Forst emphasizes that the theoretical or vertical perspective of tolerance in the state is always a matter of power. From the second perspective, tolerance is viewed as an attitude and virtue of persons who stand in relation to one another. To overcome conflicts which arise from different convictions, cultural backgrounds or religious beliefs, tolerance seems to be the correct and appropriate answer. In other words, these two perspectives on tolerance illustrate the spectrum between power and morality. Tolerance is applied as a means of power and sovereignty and as an emancipatory demand at

³ The following ideas and statements are predominantly drawn from Rainer Forst’s work “Toleranz im Konflikt” in which he elaborates the concept and derived conceptions of tolerance from a historical and analytically philosophical perspective.

the same time. Forst realizes that these two perspectives cannot always be clearly separated from each other; sometimes they are used as one entity (Forst 2003:17). *Society* as such can be considered to be one of the cases in which both perspectives are used as one.

Society

A *society* by definition is characterized ...

... by patterns of individuals sharing a distinctive culture and institutions (Oxford Dictionaries).

Therefore, a society consists of a group of people and the institutional system or state and its subsidiary organizations that hold the people and thus the society together. To meet our aim of measuring tolerance in the East Asian societies of Japan, Korea, and China and, in particular, tolerance towards highly qualified and skilled immigrants, we need to apply a comprehensive approach which combines both perspectives on tolerance. The term society is not just the sum of its parts but consists of the dynamic interplay between state and citizens. Both stand in a consistent feedback relationship to each other, in which each side reacts and adjusts its behaviour to the actions of the counterpart. Therefore tolerance in a society must be seen as the result of numerous two way interactions between a society's state and its people.

By combining Müller and Haider's definition of tolerance and Oxford's definition of society, we obtain our working definition of a tolerant society towards foreigners:

A tolerant society describes the acceptance of others (immigrants) with different beliefs, behaviours and customs by individuals who share a distinctive culture and institutions.

Another sociological term that is closely related to the concept of tolerance in society and, unfortunately, seems to be a persistent phenomenon in East Asian societies is discrimination. Does the term discrimination automatically imply intolerance or, in other words, is discrimination the opposite of tolerance?

Discrimination

According to the United Nations

"Discriminatory behaviors take many forms, but they all involve some form of exclusion or rejection" (UN Global Teaching and Learning Project)

Despite the shortness of this definition, it captures the essential elements of discrimination. Referring to the different forms that discrimination can possibly take, the most common ones are discrimination against other races or ethnicities, discrimination against women, also known as gender discrimination, and discrimination against people based on their sexual orientation. Another, publicly less known form of discrimination is age discrimination, which describes discrimination against individuals or groups because of their age (Nelson 2002:14). In Japan for instance, age discrimination can be found in job announcements where, in addition to qualification requirements, only people under a certain given age are eligible to apply for a job position. Therefore, age discrimination can frequently be observed among middle aged people who have more difficulty finding a job and, therefore, show a higher risk of becoming long-term unemployed (Shimizu 2002, February 6). The semantic interjection of all different manifestations of discrimination is the element of exclusion or rejection. In other words, a group of people who are experiencing a form of discrimination, is excluded or restricted from opportunities that are available to other groups (Giddens 2004:324). In the context of highly qualified immigrants, discrimination happens when an equally qualified foreigner does not receive the same benefits or remuneration as his native co-worker. On a broader scale, discrimination against foreigners implies that they are excluded from society to the extent that natives avoid social interactions with them at all or all contact outside of work respectively. If we compare the definitions of tolerance and discrimination with each other, it is not quite correct to consider discrimination as the opposite of tolerance. Without question, the concepts of tolerance and discrimination are closely related to each other, but whereas tolerance basically means the acceptance of different groups of people and thus implies some form of inactivity, discrimination indicates actual behaviour towards an individual or certain group of people. Consequently, discrimination can be seen as an active form of intolerance, which contributes to the reduction of tolerance in society. But before we can start searching for possible relationships between tolerance and a country's ability to attract highly qualified

knowledge workers, we need to look at the various conceptions of *human capital* and *migration* and their connection to one another.

1.1.2 Human Capital and Migration

„Migration often involves a transfer of the most valuable economic resource – human capital“ (Castles 2000:275).

Human Capital

Human capital refers to the stock of competences, knowledge, and personality attributes embodied in the ability to perform labor to produce economic value. It reflects the attributes gained by a worker through education and experience (Becker 1993:309). Human capital and physical capital (finance and land) both contribute substantially to the economic growth of a nation-state. At present, economists universally agree on the notion that human resources like knowledge and abilities are important for the economic situation for individuals as well as for the economic situation of a nation state (Schachtner 1993:21). In Adam Smith's work *Wealth of Nations*, he already included knowledge and abilities of human beings into his concept of capital (Smith 1776/1991:270-271). Theodore Schultz describes human capital as a product of deliberate investment in the form of training, education, expenditures in health, or migration. Gary Becker identifies the productive capacities of human labor as human capital (Schachtner 1993:22). Schultz claims that human capital has substantially grown in Western societies and much faster than conventional capital (Schultz 1960:571). He suggests treating "education as an investment in man" and treating "its consequences as a form of capital". Consequently, human capital becomes an essential part of a person, and it cannot be bought or sold or treated as property but it instead represents a form of capital if its output is reflected in the development of the economy (Schultz 1960:571). The level of human capital can be shown in wage differentials. The discounted present value of these wage differentials equals the capital, which is incorporated by human beings, so-called human capital (Schachtner 1993:2-4).

According to John K. Galbraith, trained and educated manpower has become a decisive production factor. He identifies the highly skilled workforce as a new class, the so-called "technostructure", that plans and manages the production of goods and consumer desires to achieve rapid economic growth (R.B. Freeman 1972:9). Freeman adds that in the

long run, economic growth in advanced countries depends almost entirely on the increases of the stock of knowledge. The mere increase in physical resources can increase growth for some time, but no more than that (R.B. Freeman 1972:35).

“The connection between economic growth and changes in technology may partly explain the relationship between general economic development and human resource development. Economies which need improvements in technology to grow will demand ‘high-level’ manpower capable of adding to the stock of knowledge, applying knowledge to production, and teaching it to others. If they do not employ a great number of scientists, engineers, and other technically trained specialists, including managers and sales personnel, they will experience a decline in the rate of economic growth”

(R.B. Freeman 1972:36).

The development and supply of a highly skilled workforce may take some time to adjust to shifts in demand. This can be explained by the rather long period of training and education respectively (R.B. Freeman 1972:38). An additional and faster way to satisfy the demand for highly skilled and qualified manpower can be achieved through immigration (Moroder 2001:18).

Immigration

Immigration describes the introduction of new people into a habitat or population for a permanent or at least longer period of time (Wordnetweb Princeton). Emigration describes the same phenomenon from the perspective of the country of origin: The individual's or group's act of leaving the native country or region to settle in another (Wordnetweb Princeton). The more general term migration or human migration covers both terms immigration and emigration and is defined as the physical movement by humans from one area to another. Migration can be further differentiated into seasonal human migration that is mainly related to agriculture, rural to urban migration or urbanization, urban to rural or suburbanization, and international migration, which describes the above defined terms immigration and emigration or the act of people crossing borders and staying in the host state for some minimum length of time (OECD 2006:17-19). Taking the reasons and motives behind international migration into account, the OECD organizes migrations into nine groups: temporary labour migrants; irregular, illegal or undocumented migrants; highly skilled and business migrants; refugees, asylum seekers or forced migrants; family members; return migrants; and long term, low

skilled migrants (OECD 2006:17-19). Migrants can also be differentiated into permanent and temporary. Permanent immigrants, on the one hand, plan to establish their permanent residence in a new country and normally seek to obtain that country's citizenship. Temporary migrants, on the other hand, intend to stay only for a limited period of time (OECD 2007:49-53). Both groups of migrants have a significant effect on the economies and societies of their chosen host countries and their countries of (OECD 2007:49-53). The economically and socially differing levels in native and host country become effective as so-called push and pull factors on the individual as well as on the economy of a state. Push factors, on the one hand, which lead to a rising outflow of people are poor medical care, not enough jobs, few opportunities, primitive conditions, political fear, fear of torture and mistreatment, religious discrimination, loss of wealth, natural disasters, bullying, and lower chances of finding courtship. Pull factors, on the other hand, which attract immigrants include chances of getting a job, better living standards, enjoyment, education, better medical care, security, family links, lower crime rates, and better chances of finding courtship (Parnreiter 2000, 27-28). Both, politicians and economists alike pay special attention and value to the migration of a highly qualified and skilled workforce. In this context, the sociologist Christoph Butterwegge speaks of a polarization of migration into *misery and refugee migration*, on the one hand, and *elite and expert migration*, on the other hand (Butterwegge 2006, October 18).

Definition of a Highly Qualified Immigrant / Foreigner

For the purpose of providing a relationship between tolerance and a country's ability to attract global knowledge workers to East Asia, a definition of this group of professionals is needed. Although the phrase "the best and the brightest" referring to highly qualified immigrants, has become an inflationary used slogan in public and policy discourses in recent years, a review of the international academic and policy literature indicates that there is no consistent definition or measurement of highly skilled migrants (Batalova and Lowell 2006:86). According to Batalova and Lowell the reasons for this gap in the literature predominantly fall into two groups: data-related and conceptual. The research on the mobility of global knowledge workers in general remains difficult to ascertain, in part due to the absence of appropriate data. Population censuses and labor force surveys are the most readily available data sources; however, they lack crucial information about immigrants such as their legal status, the degree of return migration or the place where they obtained their education (Batalova and Lowell 2006:86). Another reason that researchers are confronted with obstacles in studying the

migration of a skilled workforce are of methodological and conceptual nature. Recognition of the qualifications of skilled and qualified persons varies across countries. Furthermore, the terms “skilled worker“, “highly skilled workers“ and “professionals“ are used interchangeably in various contexts (Batalova and Lowell 2006:86).

The most fundamental definition of a highly skilled worker is a person who has obtained a tertiary education, meaning adults who have completed at least a college degree or more. On the one hand, acknowledging the fact that there are a wide range of occupations which require formal education and training such as medical doctors or lawyers, there are still a considerable number of highly skilled and successful individuals who have not attended college or university. On the other hand, if one relies solely on occupational characteristics, this does not guarantee that all people with college education or above are included (Batalova and Lowell 2006:87). Bouvier and Simcox found that 31 percent of native-born engineers and 38.7 percent of mathematicians and computer scientists in the U.S. did not obtain a college degree in 1990 although formal qualification is normally required. Likewise, the numbers for foreign-born engineers and computer scientists were 14.5 and 23 percent (Bouvier and Simcox 1995:429-444).

One attempt at establishing a global definition of a highly-skilled worker and, thus, making research on the mobility of highly skilled workers internationally comparable was collaboratively conducted by the OECD and the European Commission/Eurostat. The working definition ‘Human Resources in Science and Technology’ (HRST) is based on two dimensions: qualification (tertiary level or better education) and occupation (training/employment in a science and technology occupations) (OECD 1995:16). HRST are individuals who satisfy one or the other of the two requirements:

1. *They have successfully completed education at the third level in a Science & Technology (S&T) field of study;*
2. *They have not formally qualified as above, but are currently employed in a S&T occupation where the above qualifications are normally required*

One crucial group of individuals who are not considered as HRST yet are international students who are *currently* enrolled in the fields of Science and Technology. They represent the HRST of the future. A country's competitiveness level not only rests on its ability to attract already educated or experienced HRST but also on its ability to attract international students in general and students in the S&T field of study in particular. Studying in a foreign country is not only a life changing experience which raises the soft power of the host country among international students to a substantial degree, it is also often the stepping stone for highly skilled immigration (Moroder 2001:107). For our purpose of assessing the foreign base of HRST in East Asian countries more comprehensively, we expand the OECD definition by adding a third requirement for HRST:

3. *International students who are currently enrolled at the third level in a Science & Technology field of study.*

The establishment of the central working definitions such as *tolerance*, *society*, *discrimination*, *human capital*, *migration*, and *HRST* sets a sound foundation for upcoming research projects on the connection between tolerance and HRST. Since this thesis aims to evaluate tolerance in East Asian societies, a working definition for East Asia must be found as well.

1.1.3 East Asia

The synonyms East Asia, Eastern Asia or the Far East are broadly but incorrectly used and perceived. The UN definition of East Asia includes the People's Republic of China, including all semi- autonomous and fully autonomous regions, Japan, North Korea, South Korea, and Mongolia.⁴ *East Asia* can be defined either in geographical or cultural terms⁵. The geographic classification for East Asia is contested. Karl Ritter developed the so called “big” model that differentiates East Asia between “Northeast Asia,” which consists of Mongolia, the pacific coast area of Russia, which is in the east of the river Amur, and “Southeast Asia”

⁴ United Nations Composition of macro geographical (continental) regions, geographical sub-regions, and selected economic and other groupings

⁵ The *Weatherhead East Asian Institute* at Columbia University has been intensively engaged in defining East Asia.

(Ritter 1834). The “small” model assigns those parts of the Asian continent that are influenced by the continental monsoon, including Japan, the both Koreas, the People’s Republic of China without Xinjiang, Inner Mongolia and Tibet, and the Republic of China, commonly known as Taiwan, to East Asia. From a cultural and Anglo-American perspective, East Asia can be identified as the part of Asia that was influenced by Chinese culture, especially Chinese characters, taoism, confucianism, buddhism, the usage of chopsticks, and so forth.⁵ Applying the definition in terms of culture, East Asia consists of Japan, both Koreas, the People’s Republic of China, and the Republic of China. Vietnam for instance belongs culturally to East Asia, but geographically to Southeast Asia.

In the context of economic and political regionalism and integration, East Asia has been used to refer to a wide geographical area covering the ten ASEAN states, the People's Republic of China, Japan, South Korea, and the Republic of China (Dent 2008:2) The idea of an East Asian Community arising from the ASEAN+3 framework is also shaping the term East Asia to cover more than greater China, Korea, and Japan. If the term East Asia also includes India and Australia like the East Asia Summit does (Frost 2007), it increases the difficulty of finding a common definition. Some scholars prefer a broader definition of East Asia and frequently use the term Northeast Asia to refer to the greater China area, North and South Korea, and Japan, with Southeast Asia covering the ten ASEAN countries. Different from that definition, the Council on Foreign Relations (CFR) defines Northeast Asia as Japan and both Koreas.

According to Weigelin-Schwiedrzik, the countries in the region do not accentuate common and shared qualities to an extent that European observers think they do (Weigelin-Schwiedrzik 2004:9). In fact, there is a range of historically unsolved disputes among the states in the region that put diplomatic relations to the test on a regular basis. Interestingly, the term is hardly used in the Chinese language; in Japanese it call forth associations with expansion plans in the first half of the twentieth century and, therefore, should be used with careful consideration (Weigelin-Schwiedrzik 2004:9). Korea, which stands between China and Japan, according to Weigelin-Schwiedrzik, can be integrated into the region without problems (Weigelin-Schwiedrzik 2004:9). Weigelin-Schwiedrzik identifies the term East Asia as a European construction (Weigelin-Schwiedrzik 2004:10). Among European scholars and observers, it is indisputable that Japan, China and Korea are part of East Asia and seldom other countries are added to this perspective (Weigelin-Schwiedrzik 2004:10). East Asia is not just an geographical term but an ideological one that stands for the

perceived attitude that China, Japan, and Korea are one cultural entity (Weigelin-Schwiedrzik 2004:10). For our purposes in measuring the tolerance levels in East Asian societies, we follow the European and cultural traditions. Since tolerance is an essential part of any culture, this work applies the definition of East Asia in terms of culture which refers East Asia to the People's Republic of China, Japan and the Republic of South Korea. Acknowledging North Korea as a nation that has stood under Chinese cultural influence for a considerable length of time, we exclude North Korea from our analysis for comparability reasons.

Why tolerance plays such an essential role in a country's ability to attract highly qualified persons, is subject of the next paragraphs.

1.2 Richard Florida's Concept of the Creative Class

The Creative Class is a socioeconomic class that economist Richard Florida identifies as an essential driving force for economic development of post-industrial cities worldwide and in particular, in the US. Florida claims that an emergent class employed in the creative sector, engaged in science and engineering, research and development, and the technology affiliated industries, in arts, music, culture, and aesthetic and design work, or in knowledge-based professions of health care, finance and law, is a rising economic force, representing a major shift away from traditional industry- and service-based economies (Florida 2005:3; Florida 2002:15). Human creativity is the real source of economic value creation and, in sharp contrast to tangible commodities, it is limitless (Florida 2005:5; Florida 2002:xiv). Taking full advantage of human creativity through institutionalization, this process is, according to Florida, the biggest challenge of our time (Florida 2005:67). Florida identifies tolerance as the essential reason why the United States has been the leading nation in various fields such as business, higher education, science, music, and many others because it has nurtured its ability to attract the brightest and most talented minds to learn, work, and live in the US (Florida 2002:253). Tolerance is the very condition necessary for creativity to flourish because creativity makes no distinction between gender, race, ethnicity, sexual orientation, and outward appearance (Florida 2005:5). Florida estimates the number of the Creative Class at 40 million workers—30 percent of the U.S. workforce (Florida 2005:35)—and differentiates between two broad groups: the *Super-Creative Core* and *Creative Professionals* (Florida 2005:34; Florida 2002:69). Members of the *Super-Creative Core* include a wide range of occupations (e.g. science, engineering, education, computer programming, research), with

arts, design, and media workers forming a small subset. The primary job function of its members is to be creative and innovative. “Along with problem solving, their work may entail problem finding” (Florida 2002:69). Florida calls the second group *Creative Professionals*: They are the classic knowledge-based workers who work the fields of healthcare, business, and finance, the legal sector, and education. In order to solve specific problems, they require a high level of formal education (Florida 2005:34). Florida concludes that the Creative Class is on its way of becoming the leading force of growth in the economy in the US and worldwide in the twenty-first century (Florida 2005:3). The Creative Class has been on the rise for at least four decades, with a shift towards technology, research and development, and the internet and its related fields (Florida 2002:146). A number of specific cities, regions, and countries (e.g. Austin and Seattle in the United States and Toronto in Canada; Silicon Valley in the U.S.; and Australia, Ireland, and Sweden) have come to be identified with these economic trends and these regions are also associated with large Creative Class populations (Florida 2007:275-293). Florida’s main argument is that the members of the Creative Class are socially relevant because of their ability to create and increase economic outcomes in the form of new ideas, new high-tech businesses, and regional growth (Florida 2005:89). In his work *Cities and the Creative Class*, Florida devotes a number of chapters to the discussion of the three main prerequisites for creative cities and regions respectively. For a city to attract the Creative Class, he argues, it must possess “the three ‘T’s’”: Talent, Tolerance and Technology (Florida 2005:6). In *Rise of the Creative Class*, Florida argues that members of the Creative Class value meritocracy, diversity, and individuality and look for these characteristics when they relocate (Florida 2002:82,138). Florida has found a strong correlation between tolerance and economic growth in those cities and states that provide a more tolerant atmosphere toward culturally unconventional people, such as gays and artists (Florida 2005:100). Both, sociologists and urban theorists have noted a gradual and broad shift of values over the past decade. Creative knowledge workers are looking for cultural, social, and technological environments in which they feel they can best “be themselves” (Florida 2005:84).

Economically successful cities and regions and especially those which are successful in attracting highly qualified workforce, must possess a certain level of technology, talent, and, in particular, tolerance- capabilities. Whereas the role and positive contribution of the first two Ts to economic growth has been proved in a number of works (Lucas 1988; Solow 1956), Florida’s claim of tolerance being a driving force for economic force is quite new.

The first of the three Ts, *technology* is the most established among economists: Robert Solow won a Nobel Prize for isolating technology as the driving force in economic growth. Florida agrees with the fundamental role of technology in economic growth but stresses that technology itself is an essential but not sufficient condition for ensuring sustainable economic growth (Florida 2002:26).

The second variable Talent is highly correlated with technology because the invention and advancement of technology is based on the level and concentration of human capital in a region. Paul Romer, the founder of the Endogenous Growth Theory argues that growth is an endogenous process, based on the continues accumulation and exploitation of human knowledge (Romer 1990:72). Likewise, Robert Lucas argues that growth is a consequence of human capital (Lucas 1988:40). Places with more human capital grow more rapidly than those with less and are more capable of attracting more talent (Glaeser 1998:157). Generally, Florida agrees with the connection between human capital and economic growth but using only the education-based human capital measurement would probably leave out a vast number of talented people who have not gone through the conventional education system (Florida, 2005:42). Instead, Florida suggests measuring the actual current work of the creative class. These two measures are highly correlated, but independent tests conducted by Robert Cushing of the University of Texas at Austin have found out that measurements of the actual work performed are better at predicting innovation and growth than just measuring human capital (Florida, 2005:42-45). Florida's Creative human capital theory differs from the traditional human capital theory in two respects: First, it identifies a type of human capital, creative people, as being key to economic growth; and second, it identifies the underlying factors that shape the location decisions of these people.

The third T, tolerance, brings technology and talent together and is the most essential factor in enabling places to mobilize and attract the other two Ts. In contrast to traditional factors of production - such as raw materials and land - technology, knowledge and human capital are highly mobile factors that are attracted by an open and tolerant climate towards people (Florida 2005:7). Floridas work finds a strong connection between successful technology, talent-harnessing places, and places that are open to immigrants, artists, gays, and racial integration. (Florida 2005:7). A desirable place to live should provide thick labour markets that help match people to jobs, mating markets that encourage people to form meaningful personal relationships, a cultural climate that allows people to pursue the lifestyles they wish, and permits them to express themselves (Florida 2002:223; Florida 2005: 25).

Applying the Three T's model to measure a country's ability in generating sustainable growth in a long run is similar in some respects to more conventional international competitiveness measurements in that it takes technology and talent, or human capital, into account. Florida supplements and extends this conventional framework by adding indicators for tolerance, openness and diversity. Applying the Three T's model, Florida's findings are displayed in the Global Creativity Index (GCI) which measures global creativity. The Global Creativity Index is made up of an equally weighted combination of the Talent Index, the Technology Index, and the Tolerance Index (Florida 2007:271-274).

The Talent Index itself consists of a combination of three different measurements. First, the measurement of the Creative Class or creative occupations is based on International Labour Organisation (ILO) statistics. The ILO collects detailed data on occupations that are categorized into job fields such as scientists and engineers, artists, musicians, architects, and managers. Florida stresses that measuring the Creative Class does not capture economic growth but assesses a country's resource of creative talent, which affects growth only in combination with a wide range of other factors (Florida 2007:272). The other two Talent measures are the Human Capital Index which is based on the percentage of a country's population holding a bachelor's degree. The figures are taken from the Organization for Economic Cooperation and Development (OECD) for the year 2001. The last and third measure of Talent is the so called Scientific Talent Index representing the number of researchers per million people. The data are derived from UNESCO and cover the period 1999-2001. The overall Talent Index combines the Creative Class, Human Capital, and Scientific Talent Indexes. Unfortunately, creative class data is not available for China, Japan, and some other countries (Florida 2007:273).

The technological capabilities of a country are measured through the R&D Index and the Innovation Index (Florida 2007:273). The R&D Index measures Research and Development expenditures as a percentage of the GDP. The figures are based on statistics from the World Bank for the years 1999-2002. The innovation Index measures the number of patents granted per million people. The data are derived from the U.S. Patent and Trademark Office (USPTO) for the year 2001. The overall Technology Index combines these two indexes.

The Tolerance Index is based on two versions of Ronald Inglehart's World Values Survey for the period 1995-1998 and sixty-five countries (Florida 2007:273-274). The Values Index assesses the degree to which a country supports traditional as opposed to modern

values. The second one, the Self-Expression Index measures the degree to which a country values individual rights and self-expression. The comprehensive World Values Survey is based on national samples that average around 1,400 respondents per country.

According to Florida, the GCI is intended to capture the ability of a country to harness and mobilize creative talent for innovation, entrepreneurship, industry formation, and long run prosperity (Florida 2007:274). The full data set covers forty-five countries, including most European countries and OECD member nations except Luxembourg, the major Asian nations, and emerging economies like China and India.

Table 1: The Global Creativity Index (GCI)

Global Creativity Index Rank	Country	Global Creativity Index	Talent Index	Technology Index	Tolerance Index
1	Sweden	0.808	0.642	0.819	0.964
2	Japan	0.766	0.702	0.785	0.811
3	Finland	0.684	0.728	0.626	0.698
4	USA	0.666	0.601	0.827	0.571
5	Switzerland	0.637	0.541	0.625	0.744
6	Denmark	0.613	0.597	0.385	0.585
7	Iceland	0.612	0.658	0.463	0.717
8	Netherlands	0.611	0.643	0.366	0.824
9	Norway	0.595	0.595	0.279	0.819
10	Germany	0.577	0.468	0.511	0.753
16	South Korea	0.456	0.371	0.456	0.560
36	China	0.230	0.031	0.109	0.550
45	Romania	0.127	0.131	0.035	0.214

Source: Florida 2007: 275-277

At first glance Florida's Global Creativity Index based on the measurement of the Three T's seems to be a rational way of assessing a nation's relative ability to attract and retain global talent. But looking more closely at the figures, particularly at the tolerance-column, one is

surprised: It is hard to believe that Japan's society is almost as tolerant as Sweden's and even more tolerant than US society. Similar astonishment arises when we compare the tolerance level of Korea and China. According to the figures Denmark, Korea and China share almost the same tolerance level.

Although Florida's approach to the Three T's model is a good first step for displaying the countries' current standing in technology and talent, its figures on tolerance are highly questionable. Furthermore, they possess no explanatory power. Florida himself admits that his methodology is just a starting point in the development of a conceptual framework for further assessment and comparison. Before Florida created the Global Creativity Index, measuring the Three T's in forty-five countries, he had measured the Three T's in American metropolitan areas extensively. In contrast to the Global Creativity Index, he did not use Inglehart's World Value Survey to measure tolerance in the United States but created three innovative measurements to capture the tolerance level in American metropolitan areas: the Gay Index, the Melting Pot Index, and the Bohemian Index. The combination of these three measurements results in the overall Tolerance-/Diversity Index (Florida 2005:113-142). To measure the other two T's, technology and talent, he used a so-called Tech-Growth Index and Talent Index which also differ in terms of methodology from the GCI (Florida 2005:129-143). The question as to why Florida applied two different ways of measuring the Three T's in the United States and globally has two complementary answers: First, Florida's Global Creativity Index was published two years after the Three T's analysis of American metropolitan areas. This leads to the conclusion that Florida developed his approach further. This explanation seems to be true for the Technology Index. Instead of just measuring the technological growth in the US, in his later one *Flight of the Creative Class*, he combines R&D expenditures as a percentage of the GDP with the number of patents granted per million people to measure technology. The new approach of combining both measurements has led to a more accurate and realistic picture of the technology levels in these countries. The same improvement is true for the measurement of talent in which he combined the Creative Class Index with the Human Capital Index and the Scientific Talent Index, but regarding the measurement of tolerance, he made some compromises. In order to measure and compare the Three T's and especially tolerance on a global scale, he was forced to use data sets that are available to the same extent in most developed countries. In other words, at the expense of validity, he made the measurements comparable. The displayed and hardly meaningful measurements for tolerance in the Global Creativity Index, which are solely taken from Inglehart's World Values Survey clearly support this claim. Despite methodological constraints, which subsequently resulted in

these questionable numbers, Florida has pioneered the idea of measuring tolerance in the first place. Still, in terms of measurement and accuracy, further adjustment and development are needed. The following chapter proposes an alternative approach for how to measure tolerance in society.

1.3 How to measure Tolerance: “Google Insights for Search”

In contrast to Florida who measured tolerance by just combining two previously conducted surveys on culture and values, this work applies a widely alternative approach. In order to measure tolerance in East Asian societies, it makes use of the analytical capabilities of Google, the most frequently used searching website in the world today. Due to the unquestioned position of Google as the world’s most popular searching technology on the web, Google has proved, to a limited extent, of its ability to predict future events and outcomes like influenzas, pandemics, or the winner of the European Songcontest in 2010. Just recently Google announced that it is currently developing a tool which will be able to predict future stock market events (Niccolai 2010, May 3). Google provides a tool for registered users which analyses the interest in respective terms over the course of years, months, and even days. The data are broken down by country and subregion. The name of the tool is *Google Insights for Search*, and it is still in the beta stage, which means that Google engineers are currently adjusting and improving the tool on the basis of users’ feedback. Chay explains the tool as follows “*Google Insights for Search* analyzes a portion of worldwide Google web searches from all Google domains to compute how many searches have been done for any term, relative to the total number of searches done on Google over time. The results from this tool have search volume with scaled value from 0 to 100” (Chay 2010). This tool has also been used by a number of researchers. Three remarkable examples are noteworthy: Scharkow and Vogelgesang suggested a new method for measuring aggregate issue salience by analyzing data from search queries typed into Google Insights compared with aggregate survey data from about 500 telephone interviews. They found substantial correlations between the two measurements (Scharkow and Vogelgesang 2009:11-13). Hoffman and Novak compared data from Google Insights for Search with traditional brand-tracking metrics for monitoring brands. Hoffman and Novak found that search-trend data have real world importance in terms of corresponding to brand-attitude awareness (Hoffman and Novak 2009:3). Moreover, Askitas and Zimmermann used this tool to find the relationship between

search queries and the unemployment rate in Germany, and they found that there is a robust correlation between keyword searches and unemployment rates (Asikitas and Zimmermann 2009:7-12).

Inspired by these remarkable findings, the question arises how *Google Insights for Search* can be used in quantifying tolerance in East Asian societies. Let us assume that foreigners who face incidents of discrimination tend to search for information in the web to find out if there are other people who are experiencing the same difficulties they are. Let us also assume that the more foreigners feel discriminated the more likely they will search for information on the web. Consequently, based on both of these assumptions, we conclude that the interest intensity for the term discrimination in the web seems to be a robust proxy for the actual tolerance level of a country. These hypotheses must be even more true for HRST and international students who must, due to their social and professional environment, show a high level of media and internet literacy. For our purposes of measuring tolerance in society, we cannot expect valid results for the term *tolerance*. As we have seen in our attempt to define *tolerance*, it inherits a tremendous range of different conceptions in various contexts. *Tolerance* can be used in technical terms like *measuring tolerance*. Another, but for our purposes more promising term, which is closely related to our working definition of tolerance and is more specific at the same time, is *discrimination*. Discrimination is predominantly used in the context of society, and its derived subterms like *racial, ethnic, gender, sex, or sexual discrimination* are all related to our concept of tolerance in society and will be listed as well in *Google Insights for Search*. To draw valid conclusions from the information *Google Insights for Search* provides, we need to compare these statistics with real numbers of foreigners residing in the respective countries. Before we can start quantifying tolerance and discrimination respectively, however, we must address three potential methodological constraints: (1) differences in access to internet across regions and provinces, (2) Google's share in the search engine market (3) and the personal characteristics of Google users.

Access to the Internet

According to the Asian Internet Market Report 2009 (Evans and Hulme-Jones 2009), the market in Asia continues to be dominated by the big players of North Asia, South Korea, Japan, and Hong Kong. In terms of absolute Internet user numbers, China (300 million) and India (95 million) maintain a strong role, despite their modest numbers in terms of user

penetration. However, China surpassed the United States in 2008 to become the largest nation of Internet users in the world and was showing no signs of slowing down by the end of 2009. The Asian Internet market can be divided into three user-penetration groups. The top group is characterized by highly-penetrated markets in terms of users and subscribers. Complementary to this, they tend to have sophisticated widely- distributed broadband access facilities in place. According to the report these countries from the top group are among the global leaders in broadband Internet.

Table 2: Internet User Penetration in East Asia

Country	Internet User Penetration	Internet Users	Broadband subscriber penetration
South Korea	77%	36,800,000	32%
Japan	74%	94,000,000	24%
China	23%	298,000,000	5%

Source: Evans and Hulme-Jones 2009

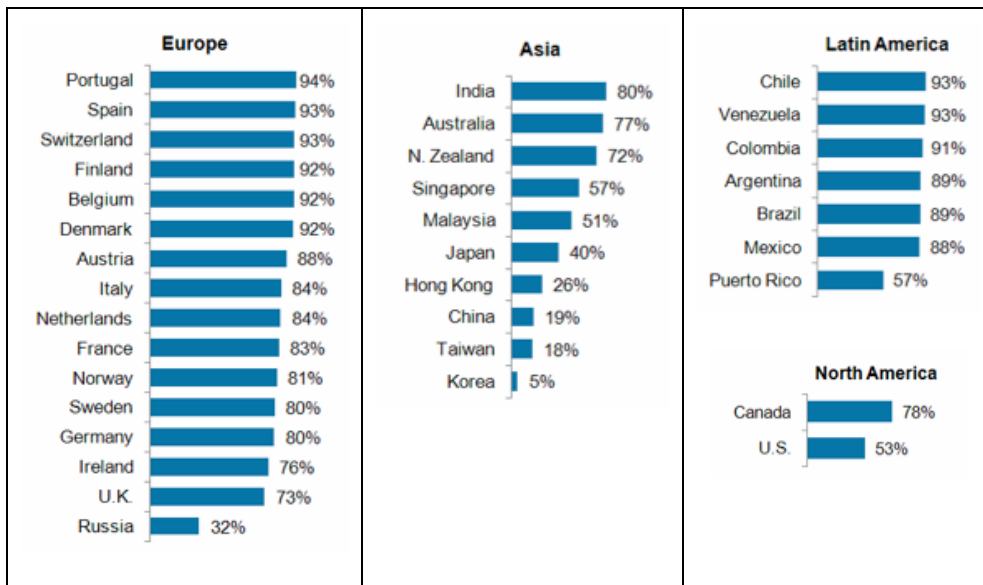
South Korea, with a user penetration of over 77 percent, tops the regional market list with a broadband subscriber penetration of 32 percent. Japan with a 74 percent user penetration is slightly behind Hong Kong and Singapore, which both show a 75 percent rate. The countries in the second group show an approximate range in user penetration between 10 and 30 percent. They are currently expanding their internet and broadband capabilities. However there is a clear gap (almost 20 percent) to be overcome before they can be listed in the top list. China jumped from 16 percent penetration in 2007 to 23 percent by mid-2009; however, its broadband penetration is still at the modest 5 percent mark. The authors of the report find that in the last few years operators and governments have begun to give priority to expanding Internet access and speed in these countries. In the third grouping, markets show a user penetration of less than 10 percent. War-ravaged Afghanistan for instance is managing 2 percent user penetration under extremely difficult circumstances.

Whereas the internet penetration rates in Japan and Korea are the highest in the world and, therefore, indicate that internet access is widely available across the country, this assumption cannot be made for China. When we look at the penetration rate by Chinese regions a strong imbalance between its rural and urban areas can be assisted. In the more urban regions in East China the penetration rate is substantially higher than in central or western China. This major constraint must be taken into account when we interpretate the data that *Google Insights for Search* provides for China.

Search Engine Market and Internet Users

On a global scale, Google is the uncontested leader on the Search Engine Market. Google basically owns the market in Europe and Latin America but seriously lags behind in Asia with a market share less than 50 percent in Japan, Hong Kong, China and Taiwan. In Korea Google only owns a share of five percent, where the national search engine *Naver* controls the Korean market (Crampton 2008, March 19).

Fig. 1: Google's Global Search Engine Market



Source: Crampton 2008

However, the relatively low popularity level of Google among East Asian internet users turns out to be a methodological asset rather than a constraint for our assessment of tolerance in East Asian societies. Based on the fact that Europeans, North Americans, and Latin Americans predominantly use Google for search requests, it can be assumed that they show the same preference for Google while they are residing in a foreign country. Likewise we can assume that a substantial share of foreigners from Europe, Latin America, and North America who are residing in East Asia, use Google for search operations on the web. We can substantiate this assumption by comparing the regional distribution of foreigners in Japan's, Korea's, and China's provinces with the regional distribution of search requests for the term "discrimination". If there is a strong relation between both data sets, it indicates that foreigners residing in the respective countries were the actual Google users who were looking

up information on discrimination. However, Google Insights for Search does not provide any personal information such as age, educational background or occupation of its users which makes the actual identification of HRST or other occupational groups who might experience discrimination in East Asian societies, impossible.

Taking the above methodological limitations into account, Google Insights for Search fulfills the main purpose of this work: the quantification and thus comparison of tolerance in the three major East Asian nations Japan, Korea, and China. Based on Richard Florida's claim that a considerable level of tolerance in society is essential for attracting highly qualified knowledge workers, the identification of the actual tolerance situation in East Asia may lead to a paradigm shift on how immigration policies are formulated, implemented, and enforced in East Asia.

1.4 Structure of the Country Chapters

At the beginning of each country chapter, we describe the status quo of Science and Technology and HRST. This is followed by the national policies and initiatives used to raise the inflows of international HRST and students. National policies not only reflect the tolerance level of a society towards immigrants and in our case towards global talents, they also determine the range of impact immigrants can possibly have on society as a whole and on various fields and sectors respectively. In order to make policies and initiatives of different nation-states comparable, we look at how states form their access rules and what specific incentives and programmes they offer for highly qualified foreign- knowledge workers. Outlining the present situation on the supply and demand of global talent and derived strategies for attracting these people, we turn to the assessment of tolerance by interpreting the data collected from Google. At the end of each country chapter, concluding remarks recap the generated findings.

After establishing the analytical framework in terms of definitions, concepts, and research design, we turn to the empirical findings.

2 Empirical Findings

Bringing tolerance in society and the ability to attract people and, in particular, HRST together is a challenging task. Whereas, in order to maintain economic growth, the supply and demand for human capital can be measured and, therefore, identified relatively easily, quantifying tolerance and establishing meaningful connections to the degree of attractiveness of a nation seems to be considerably more difficult to accomplish. In the past, a number of qualitative surveys aimed at capturing issues on discrimination and tolerance have been conducted in various contexts such as discrimination at workplace or inequality in the European Union. Their basic approach in collecting information has been and still is a qualitative one. On the basis of interviews, they drew conclusions and identified certain patterns and trends. Generally, conducting personal interviews seems to be an adequate way of gaining primary data on inspecific or culture-related issues such as tolerance and discrimination. One major disadvantage of this kind of data-collecting method is that it is not able to capture any form of intuition or spontaneity. All answers the respondents give are the result of self-reflexive streams of thought about situations that could possibly have happened a long time ago. The required process for recalling certain experiences from the past and formulating an adequate answer after the actual experiences were made, indicates that information which has been gained through personal interviews does not reflect actual experiences and derived feelings to the full extent. Given the fact that the internet provides instant access to all sorts of information and Google is predominantly used by non-Asians, data on instant changing trends in Google search behavior for the term “discrimination” makes insights into foreigner’s perception of tolerance in East Asian societies possible.

Tolerance and discrimination are not specific to the East Asian region. Almost all countries in the world show a history of political repression and systematic discrimination, owing to differing ideologies, power struggles or culturally home-grown constraints. Even in traditional immigration countries such as the United States, Australia, and the Netherlands, issues of discrimination and tolerance are frequently covered in the media and are heavily contested in the public sphere. However, discrimination against foreigners and expatriates, exemplified by the large number of articles and personal blog entries found on the internet, indicates that incidents of discrimination are not exemptions but a major social phenomenon in East Asian societies. Referring to Florida, who claims that tolerance is the essential ingredient in attracting talented people to a place, the assessment of tolerance is a long

overdue task in order to ensure the continuation of the East Asian miracle in the twenty-first century.

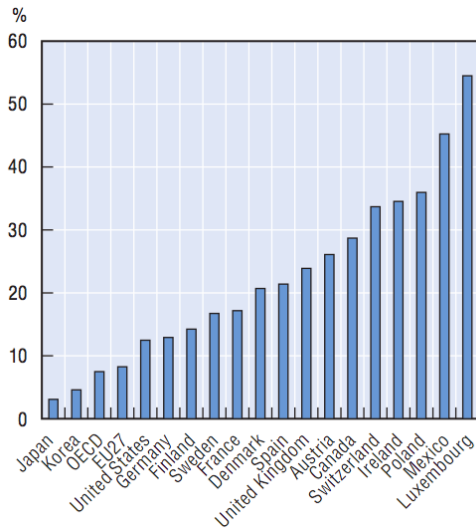
The following country chapters aim to find potential connections between the East Asian countries' ability to attract global talents and their current tolerance situation. To do so, a two-step approach has been chosen: First, the current status quo on Science and Technology and HRST, followed by policy measures that have been initiated by the governments to attract HRST, will be presented. In the second step, we apply Google Insights for Search and compare the results with relevant data, such as the number of foreigners living in respective provinces, to find indicators that foreigners were the actual users who looked for information on discrimination.

2.1 HRST and Tolerance in Japan

Today, Japan is still, according to many indicators, at the forefront of science and technology (OECD 2008a:132). Japan's total R&D intensity accounts 3.4 percent of GDP in 2007, which makes it the highest among G7 countries and above the OECD average of 1.9 percent. Between 1997 and 2007 Japan alone was responsible for about 20 percent of the growth in business R&D among OECD members (OECD 2008a:132). The numbers show clearly that Japan is one of the leading countries in R&D intensity and business R&D, but the heavy investment in Japan's R&D sector has not always brought the expected outcome (OECD 2008a:132). Although Japan is the world's second largest producer of scientific articles in absolute terms, the nation's production of scientific articles on a per capita basis is below the average for other OECD countries and the number of citations is relatively low as well (OECD 2005:120). A small number of companies have introduced new-to-market innovations, a modest 26 percent of large firms and 11 percent of small and medium-sized firms for the period 2002-2004 (OECD 2008a:132). Besides structurally weak ties between the business sector and research organisations in the public sector, the OECD makes the low level of international R&D linkages and cooperation responsible for the disappointing returns (OECD 2008a:132). Figure 2 illustrates that for the period 2002-2004 Japan's share of patents with a foreign co-inventor was about three percent (OECD 2008a:133). Compared to the mid-1990s, this result represents a decrease of 30 percent. Foreign affiliates accounted just for five

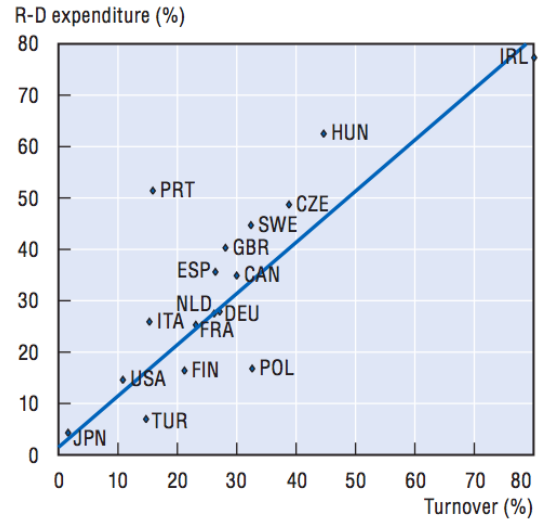
percent of industrial R&D, which completes the picture of a national rather than a global approach in Japan's S&T and R&D sectors.

Fig. 2: Patents with foreign co-inventors – Share of patent applications to the European Patent Office, 2002-04



Source: OECD 2008a, 133

Fig. 3: Share of R&D expenditure and turnover of affiliates under foreign control in total R&D and turnover, 2004



Source: OECD 2008a, 133

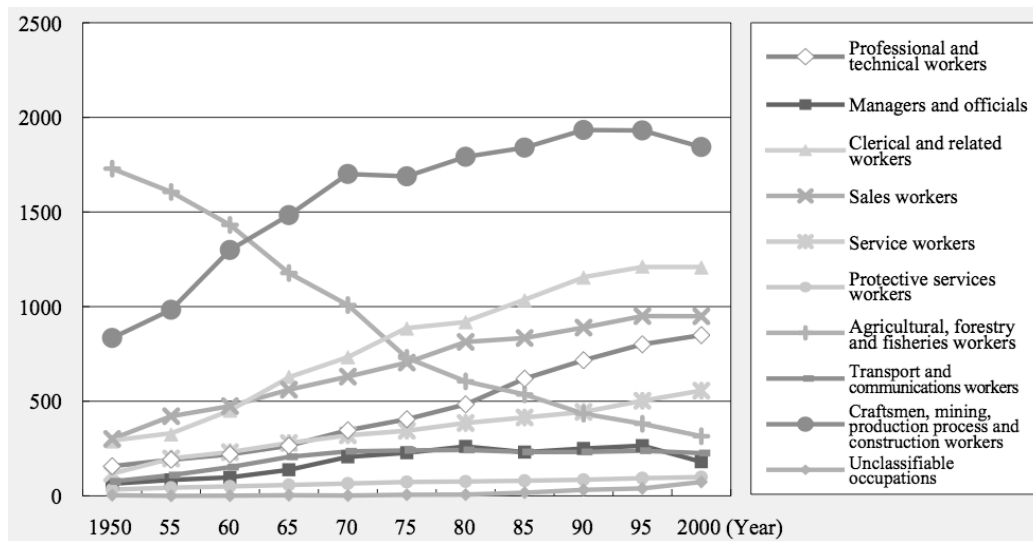
Do the numbers indicate that Japanese researchers, scientists and engineers have low interest in collaborating with foreign HRST or is it the other way around, namely that foreign HRST do not want to work with their Japanese colleagues? Maybe it is both. Is it possible that cultural issues such as low mutual cultural understanding, a tendency towards discrimination towards the unknown or differing conceptions in terms of work life such as hierarchy at work come into play?

The following subchapters try to find an answer to the question whether a potential lack of tolerance in Japanese society stands in close relation to the low level of foreign HRST working and residing in Japan. Before we start looking for potential relationships between tolerance and Japan's ability being a talent magnet or not, we begin with an assessment of the supply and demand of HRST in Japan and the policies initiated to attract international researchers, students and faculty.

2.1.1 Status Quo of HRST

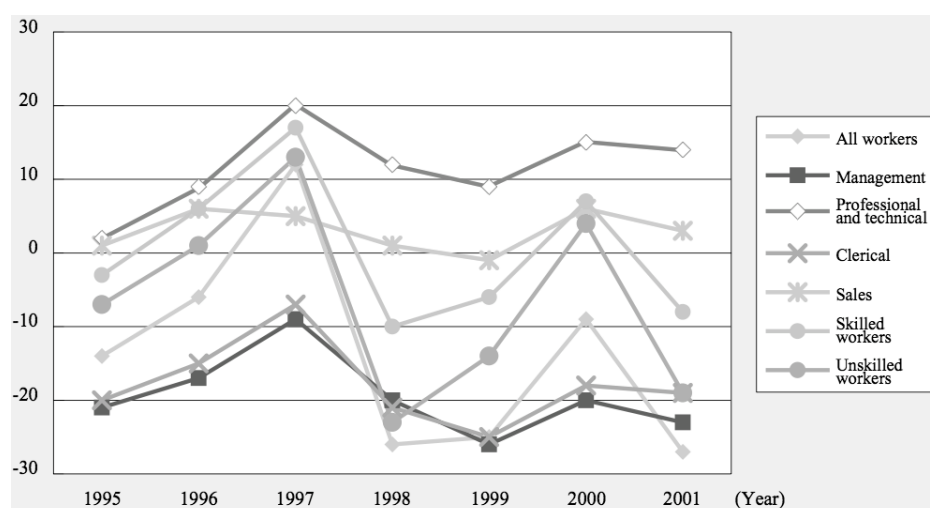
The Japanese Population Census classifies most HRST as 'professional and technical workers.' Since the 1950s, their number has been consistently increasing as has their share of total employed persons from 4.3 percent in 1950 to 13.5 percent in 2000 (MEXT 2003:7)

Fig. 4: Trends in Number of Employed Persons by Occupation (10,000 persons)



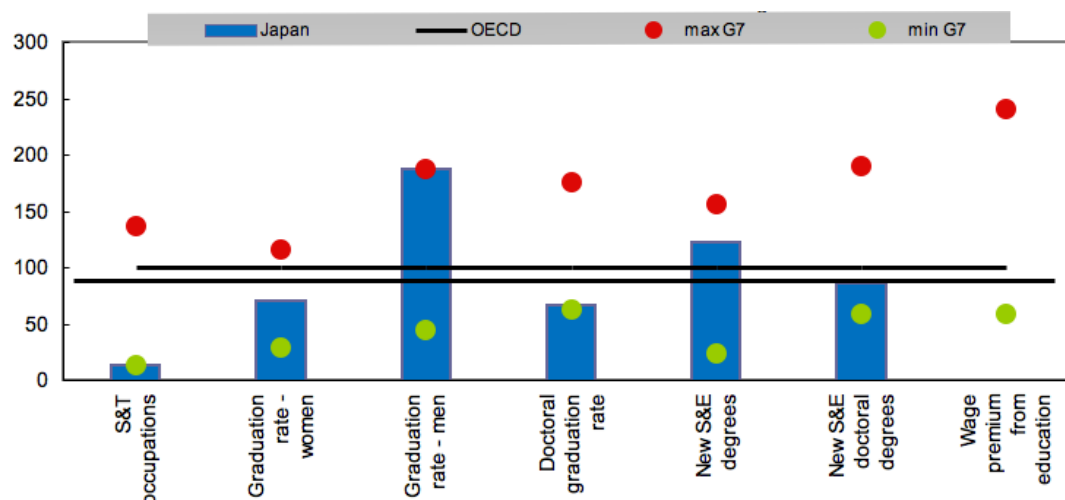
Source: Ministry of Public Management, Home Affairs, Posts and Telecommunications, Statistics Bureau. "Population Census"

Despite the increase in professional and technical workers as shown above, according to the "Survey on Labor Economy Trends," the shortage remains at a high level for this occupation category in the manufacturing industry, indicating there is a high demand for HRST (MEXT 2003:7).

Fig. 5: Trends in Labor Surplus/Shortage by Occupation in Manufacturing Industry

Source: Ministry of Health, Labour and Welfare: Survey on Labour Economy Trends

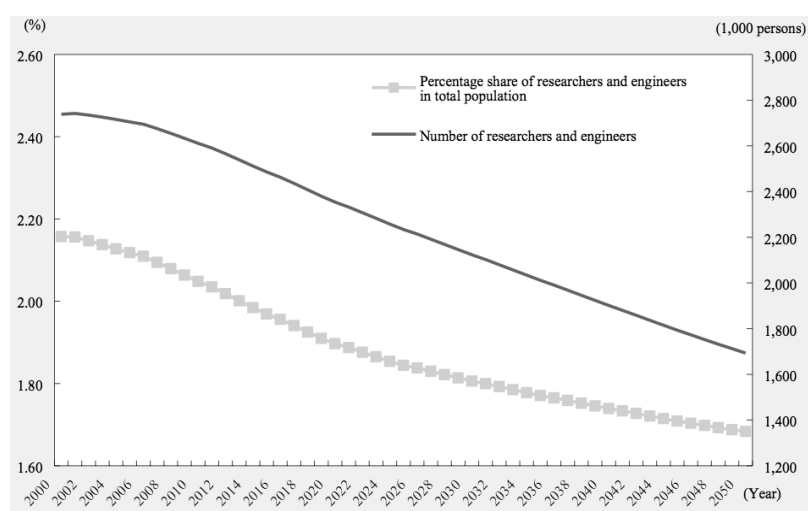
The total stock of professional and technical workers is about 8.64 million persons in the Population Census. Engineers account for about 2.66 million, the largest proportion. The second largest share are health and medical professionals such as doctors (about 2.35 million), and teachers (about 1.37 million, of which lecturers at universities and colleges account for about 170,000). Likewise, scientific researchers total about 160,000. Looking at the number of new graduates from the higher education sector in the fields of natural science, the total number was about 220,000 in 2002 (MEXT 2003:8). More recent numbers from the OECD Science, Technology and Industry Scoreboard 2009 show that university graduation rates for men (43 percent) are the highest among G7 countries but female rates (34 percent) are low (OECD 2009a). Japanese women's participation in scientific studies is also the lowest: no more than fifteen percent of Science and Engineering degrees are awarded to women. Ph.D. graduating rates at one percent are with below the OECD average, which stands at 1.3 percent. Although employment with a university or college degree increased by almost three percent from 1998 to 2007 and amounts to over 40 percent of total employment in Japan, the share of occupations in S&T at fifteen percent is the lowest among G7 members (OECD 2009a).

Fig. 6: Investing in the knowledge economy

Note: All variables are OECD-based indexes with OECD average = 100

Source: OECD Science, Technology and Industry Scoreboard 2009 - Japan Highlights

Due to the rapid aging of Japanese society as a whole, the share of the middle and higher aged among HRST has also become higher. This trend will continue in the future. Based on the assumption that percentage shares of researchers in natural science, engineers, and lecturers at universities and colleges for each age groups in the population will not change in the future, Figure 7 illustrates that the number of HRST will decrease rapidly, both in numbers and in proportion to the total population (MEXT 2003:9).

Fig. 7: Projection of Numbers of Researchers and Engineers in the Future

Source: Ministry of Public Management, Home Affairs, Posts and Telecommunications. Population Census (1995); National Institute of Population and Social Security Research. Population Projections for Japan (projected as of January 2002)

The status quo of the Japanese HRST is a severe threat to Japan's ability to compete in a globalized world as well as for its standing as a leader in the fields of technology and innovation. The numbers speak a clear language: The combination of an already high demand of HRST in the present with a rapid declining number of researchers and engineers in the future forces policy makers to take comprehend and coherent actions in attracting foreign HRST.

2.1.2 Strategies for attracting Foreign HRST

Based on the Science and Technology Basic Law that was enforced in 1995, the first Science and Technology Basic Plan was adopted in 1996 (Government of Japan 1996), and the Second Science and Technology Basic Plan in 2001 addressing the period 2001-2005 (Government of Japan 2001). Japan's most recent published science and technology strategy is set out in the *Third Basic Plan, 2006-2010* and is derived from long-term guidelines that aim to address threats and challenges respectively, such as the rapid aging of the nation's population and climate change. The upcoming fourth version is expected to be published in the course of the fourth quarter 2010. According to the Third Basic Plan, investment in human resources, native and international alike, is acknowledged as a priority from 2008 (Government of Japan 2005:22-59). The Global Center of Excellence (COE) Program, for instance, is designed to provide funding support for developing and establishing world-class education and research centres in university graduate schools and related research institutes. Likewise, the World Premier International Research Centre Initiative aims to create "globally visible research centres" that attract top-level researchers from around the world (MEXT 2008).

Similar to the Japanese government's traditional immigration policy, the Japanese tertiary sector's engagement with global academia has been relatively weak. This is true for the outflow of Japanese students and researchers as well as for the inflow of corresponding international groups (OECD 2009b:79). Furthermore, Japanese higher education institutions can rarely be found outside their national borders (OECD 2009b:22). Despite this decades-long trend, the OECD evaluated Japan's recent efforts at internationalizing its tertiary sector are significant (OECD 2009:79). In order to increase the enrolment of international students, the first internationalization strategy labeled as *International Student 100,000 Plan* was

presented in 1983. The aim was to increase the number of international students from 10,000 in 1983 to 100,000 by the beginning of the new century. The plan enjoyed a high priority in the government's political agenda, and sufficient financial resources were provided for the establishment and expansion of governmental scholarships for international students (Umakoshi 1997:259-273). The plan's goal was met and even exceeded by 2003 when around 110,000 foreign students were enrolled at Japanese higher education institutions (OECD 2009b:79). Breaking down graduation levels, on the one hand, at present international undergraduate students are mainly enrolled in less-selective private institutions. Graduate and post-graduate students, on the other hand, can be found mostly at prestigious national state universities and some private facilities (Goodman, 2007:71-87). With 73.9 percent of new enrolments in 2003, undergraduate students accounted for the major share of international students. Breaking down the international students by sending region and country, Asian countries total 93 percent of all international students in Japan. Among them 80,000 Chinese students in the year 2005 represented two-thirds of all international students and were thus the most visible foreign-student population (OECD 2006c:224). Whereas there has been an dynamic inflow of Asian students into the Japanese tertiary sector, there has been only a very slow increase of non-Asian student enrolments since 1983 (OECD 2009b:80). Despite this recent trend towards internationalization and regionalization respectively, Japan's higher education sector remains national in its nature. Whereas the average share of international students is 7.3 percent in the OECD, Japan's ability to attract international students amounts to only 3.3 percent (OECD 2009b:80).

Despite the growing regional competition in the higher education market, especially from Korea, Japan still has the most mature higher education system in the Asian continent (OECD 2009b:82). Its top research institutions are among the best in the world and have the capacity to attract highly qualified graduate students from abroad, especially in fields where Japan is considered as one of the leaders such as engineering, materials and nanotechnology (OECD 2009b:82). Slowly the awareness in Japanese society is growing that the national knowledge society needs to become internationally oriented (OECD 2009b:82). The universities and colleges play a central role in this task. For instance, the efforts to attract overseas students have been intensified. One important step in achieving this goal has been the sharp increase in the number of courses that are instructed in English (OECD 2009b:84). In 2003, almost half of all Japanese universities (306) held classes in foreign languages, and at some institutions, all courses were instructed in English (OECD 2009b:82). Raising the view from the institutional to the governmental level, MEXT shows a stronger international

orientation as well. The Central Council for Education presented in its report *Development of a New Foreign Student Policy*, a student-oriented agenda that focuses on a higher students exchange rate and the development of a new admissions system for ensuring the quality of international students (Central Council for Education 2005). In reaction to the proposal the Japanese state made structural adjustments and merged in 2004 all related organisations into the Japanese Student Services Organisation (JASSO). The JASSO supports activities for Japanese students and international students in Japan (JASSO 2010). In addition the Japan Society for the Promotion of Sciences JSPS, also introduced in 2005, offers an incentive system for the internationalisation of tertiary education, which is called the *Strategic Fund for International Headquarters in University* (JSPS 2005).

Although Japan's tertiary education system has widened up more to the world and inherits essential strengths in some key fields of studies, a number of challenges remain, which, according to the OECD, need to be addressed in a comprehensive and coherent manner. One of the challenges identified is the language barrier for many American and European students (OECD 2009b:82). Despite the increasing number of courses offered in English, it is almost impossible to be enrolled in a regular degree programme at a Japanese university without having profound knowledge of the Japanese language. Foreign researchers, who are essential for each nation's competitiveness in a globalized world, face severe difficulties in building a careers at Japanese universities. Only since 1982 have the recruiting and employment terms for foreign professors at Japanese national and prefectural/municipal universities become identical to those of their Japanese colleagues. However, the universities can decide autonomously on the length of employment (OECD 2009b:84). In the published *White Paper on Science and Technology* from 2003, additional barriers such as the "living environment for family members, the high price of goods and other economic conditions, and language barriers in everyday life" were identified (MEXT 2003). Comparing the numbers of foreign faculty members in Japan with other OECD countries, they are very small. In 2005, only one percent of full professors and three percent of associate professors at the most prestigious institution in the country, the University of Tokyo, were foreigners (OECD 2009:84).

The assessment of foreign HRST residing, working and studying in Japan shows that Japan's ability in attracting these globally sought after human resource is weak. Suspecting that Japanese society's low tolerance towards foreigners could be among others, one

contributing factor of Japan's weak attraction to international HRST, the following chapter tries to draw a picture of tolerance in Japan.

2.1.3 Hard Data on Tolerance

Through Google as shown in Figure 8 we are able to see the trend of search requests for “discrimination“ of users residing in Japan between 2003 and the end of August 2010. Unfortunately, the data do not show us to which stories or specific websites the peaks in 2004 and 2005 are referring. Apart from the years 2004 and 2005, which can be characterised by great fluctuations in the number of requests, the average interest in “discrimination“ on Google between 2004 and 2010 amounts to 49 on the normalized scale. Basically, the level of discrimination and tolerance respectively has not changed to a significant extent since 2004.

Fig. 8: Interest in “discrimination“ over time - 01.01.2004-28.10.2010



Note: The data is normalized and presented on a scale from 0-100⁶

Source: Google Insights for Search

Looking at Google's results on the regional level broken down by prefectures, we gain more insights into tolerance in Japanese society. Interestingly, users who were looking up information about discrimination were located in Japan's most populated prefectures, which indicates that discrimination issues tend to play a more important role in Japan's metropolitan areas, where likely more foreigners in general and HRST, in particular, can be found. In 2003,

⁶ The numbers on the graph reflect how many searches have been done for a particular term, relative to the total number of searches done on Google over time. They do not represent absolute search volume numbers because the data is normalized and presented on a scale from 0-100. Each point on the graph is divided by the highest point or 100. When Google does not have enough data, zero is shown.

there were 1,915,030 registered foreigners in Japan, representing 1.5 percent of Japan's population of 127 million. Most foreigners live in the Kanto, Chūbu and Kansai regions. Tokyo has the highest percentage of foreigners (2.8 percent), followed by Osaka (2.4 percent), Aichi (2.3 percent), Kyōto (2.1 percent) and Mie (2.1 percent). The prefectures with the smallest proportion of foreigners are Hokkaido (0.3 percent), Kagoshima (0.3 percent), Aomori, Akita, Kumamoto and Miyazaki (all 0.4 percent) (Ministry of Internal Affairs and Communications 2010), and these do not show in Google's ranking in terms of regional interest.

Fig. 9: Regional Interest in “discrimination“ - 01.01.2004-28.10.2010



Note: The data is normalized and presented on a scale from 0-100

Source: Google Insights for Search

As shown in Figure 10, which lists the top searches for terms related to discrimination, three groups of issues can be identified in Japan: discrimination against other ethnicities, discrimination against women, and age discrimination. Google also provides information about which searches have been increasing in interest. These are “age discrimination,” “discrimination against women,” “discrimination in Japan,” and “gender discrimination.” Since 2004, these search terms have experienced a change in growth greater than 5000 percent, which shows that women residing in Japanese society feel suppressed.

Fig. 10: Top Searches⁷ Terms on “discrimination“ - 01.01.2004-28.10.2010

Note: The data is normalized and presented on a scale from 0-100

Source: Google Insights for Search

Due to the application of “Google Insights for Search,” three main findings on discrimination and tolerance in Japanese society can be identified respectively:

1. The level of discrimination has not changed significantly for the period 2004-2010.
2. Discrimination tends to be a problem in more metropolitan areas.
3. Discrimination against women is on the rise.

2.1.4 Conclusions

Despite the fact that Japan is still at the forefront in the S&T field, the demographic trends in combination with the alarming shortage of HRST, make it only a matter of time until Japan loses its leading position. Japan is also a leading country in terms of investment intensity in S&T, but the output has been rather mixed. Besides structural factors such as the low degree of interlinkages between industry and research institutes, the low level of international cooperation between Japanese researchers and their foreign colleagues has been identified as an essential reason for the rather disappointing results in some areas. In terms of HRST, although Japan’s share of university graduates is one of the highest among other advanced

⁷ *Top searches* refers to search terms with the most significant level of interest. These terms are related to the term you have entered; if the user does not enter in a search term, the top searches will be related to the category or country/territory the user has chosen. The system determines relativity by examining searches that have been conducted by a large group of users preceding the search term the user has entered, as well as after.

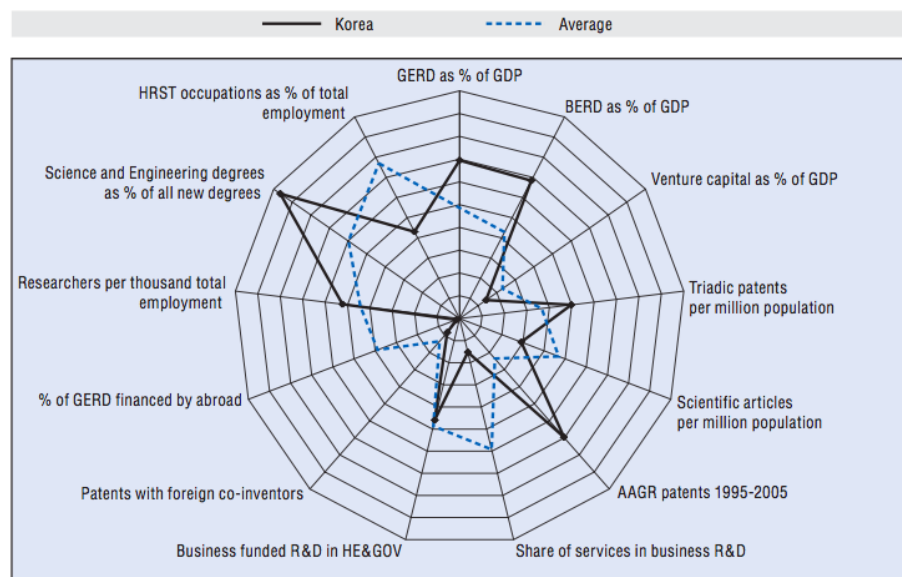
countries, the share of HRST of total employments is below the OECD average. Likewise, Japan does not utilize its female workforce adequately. The proportion of women receiving degrees from S&T fields of studies as well the share of female HRST being employed in S&T are among the lowest in the OECD. Japan's internationalization efforts in the higher education sector have gained momentum, but still, the share of international students is far below the OECD average. The low proportion of foreign faculty members contributes to the still dominant national character of Japan's research environment. Complementary to that, there also still exist a number of substantial barriers such as language, high price level for goods and services or difficulties in daily life for family members that make Japan a less attractive place to work and live. In terms of tolerance, Japan's tolerance level does not seem to have changed significantly since 2010. Furthermore, issues related to discrimination seem to be more relevant in metropolitan areas with higher shares of foreigners which indicates that foreigners are the actual users searching for information on discrimination. Looking at the top searches and so-called breakouts, displaying terms that have risen in interest over 5000 percent since 2004 shows that discrimination against foreigners, ethnic minorities, and women is on the rise.

All in all, the findings Google provides on tolerance, correspond with the results of independent reports on Japan's performance in S&T: Japan's rather disappointing outcomes in S&T are not owed to inadequate input intensity but due to Japan's low ability to attract international global HRST, which is rooted in unequal opportunities for women in general and foreign HRST within Japan's innovation system in particular. Referring to the definition of discrimination, Japan still seems to exclude certain individuals and groups of people based on their differing cultural background and/or gender. From these observations, we can conclude that there is a rather robust relationship between Japan's ability to attract global HRST and its low tolerance towards foreigners.

2.2 HRST and Tolerance in Korea

Korea has performed tremendously well over the past decades. Adoption and adaptation of imported technologies have played an important role in its ability to catch up with the leading OECD economies (OECD 2009c:96). Due to its industrialisation process relying on chaebol, big business conglomerates, the Korean economy is characterized by very large firms and a heavy emphasis on information and communication technologies and automobiles (OECD 2009c:111). Universities tend to play a less important role in R&D and are primarily regarded as teaching institutions (OECD 2009c:154). Furthermore, there are few linkages between small and medium-sized firms and the public sector and relatively little collaboration with international partners, which is reflected in the modest cross-border involvement in patenting (OECD 2008a:135). Basically the R&D landscape is dominated by the domestic private sector, which is led by large Korean business conglomerates. In terms of input, R&D expenditure has increased rapidly, and Korea is now among the leaders in terms of R&D intensity (OECD 2008a:134). Gross domestic expenditure on R&D accounted at over 3.2 percent of GDP in 2006 (OECD 2008a:134). The absolute number of researchers is also above the OECD average (OECD 2010a:18).

Fig. 11: Korea's Science and Innovation Profile



Source: OECD 2008a, 135

However, like Japan, outputs from R&D investment indicate a mixed or not overall satisfying performance across all areas. Whereas the number of triadic patent families has grown rapidly in the course of the last years (OECD 2009c:86), generally most of the patents are in low-technology industries. Furthermore, there are doubts about the effectiveness of patent exploitation (OECD 2009c:233). The production rate of scientific articles, is still clearly below the OECD average when adjusted for population (OECD 2009c:85).

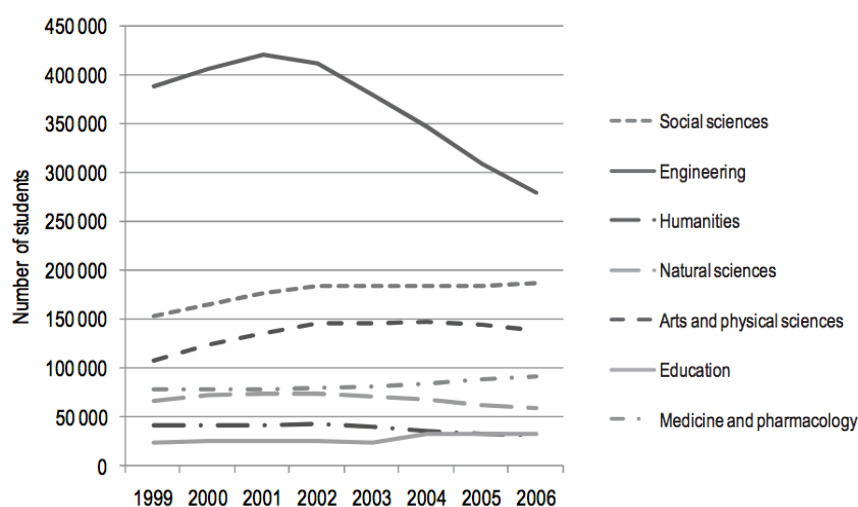
If we look at the HRST situation in Korea, it shows that the share of HRST occupations of total employment is far below the OECD average but at the same time, the share of science and engineering degrees among all new degrees is clearly higher than in other OECD countries (OECD 2009d:33). Does this mean that the gap in HRST occupations will be closed soon by the large number of graduates in technical fields? Will Korea be able to meet its demand for R&D and S&T personnel solely through home grown talent? The following paragraphs give answers to these questions.

2.2.1 Status Quo of HRST

One of the most frequently used explanations for Korea's transformation from an agricultural economy into one of the most modern economies in the world has been the growing population and investment in human capital. However, this main asset is under threat to the extent that the falling birth rate and subsequent aging rate of Korean society is among the highest in the world (Kim 2010, February 26). In 2009, Korea's total fertility rate was 1.14. This was the world's lowest birth rate. If this trend continues, Korea's economic growth potential will weaken substantially. According to numbers from the Korea Development Institute, the low fertility rate will decrease Korea's potential GDP growth rate from five percent currently to 2.3 percent in 2030 (OECD 2009c:145). Additionally, due to the low birth rate, fiscal problems such as the funding of pensions by a much smaller domestic labour pool may arise. A number of changes in the economic and social sphere have contributed to the declining fertility rate. One of the most remarkable and specific features of the Korean economy, which became a victim of the Asian crisis in 1997, was the abolition of the tradition of lifetime employment (Miyazaki 2003, August 22). Today, job applicants face a job market that does not provide the security of full-time employment as it did for the previous

generation. As a consequence, owing to the fragile labour environment, young adults delay marriage and children (Choi and Kim 2007:1). Forecasting the numbers of Korea's economically productive population shows a worrying trend. The number of Koreans aged 15 to 64 will decrease after peaking at 36.19 million in 2016, and the share of people aged 25 to 49 will decrease from 59.6 percent in 2005 to 44.4 percent in 2050. The age-group 50 and above, as a share of the economically productive population, will increase from 20.5 percent in 2005 to 40.9 percent in 2050 (Choi and Kim, 2007:5).

Across Korea's whole industrialization process, a sufficient supply of HRST has been the foundation of industrial policy in general and S&T policy in particular (OECD 2009c:152). The number of researchers per thousand total employment was above the OECD average in 2005 (OECD 2010:18). Since the R&D spending is concentrated in the business sector (Sakakibara and Cho 2002:680), the vast majority of these researchers are employed by companies (OECD 2009c:152). In contrast, Ph.D.s are predominantly employed at universities (MoST and KISTEP 2007). The overall increases in researcher numbers have been achieved through an expanding number of student enrolments at all levels of schooling (OECD 2009c:153). Corresponding to this trend, Korea produces the highest numbers of science and engineering graduates as a proportion of the total (OECD Online Education Database). The female graduation rate in these subjects is also close to the OECD average at around 30 percent (OECD Online Education Database), but the low share of women employed in S&T sectors indicates that many choose to stay at home (OECD 2009c:153). The number of Ph.D.s awarded to women is also the lowest among the advanced OECD countries (OECD Online Education Database). The most recent data from the Korean Ministry of Education show a rapidly worsening situation in science and engineering degrees. The fall of engineering enrolments at junior colleges has been dramatic since 2001 (MEST Online Statistics).

Fig. 12: Junior College Enrollment by Field, 1999-2006

Source: MEST Online Statistics

Similar trends can be observed in most OECD countries and not just in Korea. The OECD proposes that an overproduction of engineering graduates and subsequent lower prospects of finding an adequate workplace could have led to the decline in enrolments in the science and engineering fields (OECD 2009c:156-157). According to the Korean Educational Development Institute, a significant mismatch between supply of and demand for human resources, in terms of qualifications, exists. There are too many people with bachelor's degrees and too few with master's or doctoral degrees in high-technology fields (OECD 2009c:24). Another OECD report, claims that junior colleges are preparing too few technicians, while there are too many individuals with bachelor's degrees who cannot find appropriate employment (OECD 2009d:46). Today, college graduates have lost their former privileged status in the labour market and now compete with workers who have received their qualifications solely from vocational high schools (OECD 2009d:44).

In terms of mobility, Korean HRST show a relatively high rate of activity (OECD 2009c:27). The average growth rate in the number of scholars working abroad is the highest in the world at approximately ten percent over the last ten years (OECD 2009c:163). Furthermore, there were over 100,000 Korean students living and studying in the United States in 2007, more than from any other country (OECD 2009c:27). A large share are studying postgraduate courses in science and engineering and, therefore, inherit substantial potential to boost HRST in Korea. Still, it seems that this potential may not be realised in the near future. The number of Ph.D. students returning to Korea after their graduation in the US

has rapidly declined over the last decade (NSF 2004). The first findings on the reasons for this substantial brain drain, at least for the short term, suggest that higher quality research and work environments in the United States, a lack of matching post-doc positions in Korea; and better conditions for raising and educating children in the United States have contributed to this. Meanwhile, the number of foreign HRST in Korea has stagnated at approximately 25,000 since 2000. They account for about six percent of the total foreign labour force. In contrast, in Japan the share of skilled labour accounts for 19 percent of foreign labour (OECD 2009c:165). According to a OECD report from 2007, the low share of highly- skilled workers is largely owned to problems in the business and living environment and regulations that make it difficult to work in Korea (OECD, 2007c:10). What measures and incentives the Korean government has initiated to attract Korean and foreign HRST is the subject of the next chapter.

2.2.2 Strategies for attracting Foreign HRST

Overall the Korean R&D system, like the Japanese one, is considered to have been relatively closed to the outside world: Few foreign scientists work and live in Korea, few foreign research centres are located in Korea, and the levels of international research cooperation are low as well (OECD, 2007c:27). However, in terms of Korean students studying and working outside Korea, this is certainly not the case. Many Koreans choose to study overseas for their doctorates, as well as an increasing number for their bachelor's and master's degrees. To ensure that this generation and future generation of highly qualified Koreans do not choose to stay abroad, the Korean government has intensified its efforts to improve the internationalisation of its S&T base. It also has recently started several policy initiatives that seek to promote international R&D collaboration, attract foreign R&D centres, and attract global talent to study and work in Korea.

In regard to the international mobility of HRST, the OECD concludes that it is more the low utilisation of foreign expertise than the brain drain of Korean talent that is problematic for Korea (OECD, 2007c:248). If Korea does not succeed in attracting more foreign highly-skilled and qualified knowledge workers, it risks deteriorating its native science base. As a consequence, two government subsidy programmes, the Brain Pool programme organized by the Korean Federation of Science and Technology Societies (KOFST) and the Post-doc Fellowship Programme were started during the 1990s to attract foreign researchers to Korea.

For the period 1994-2006, approximately 1500 foreign researchers received financial and logistical support to conduct their research in Korea. However, compared to world-class research countries such as the United States and many European countries, the level of talent inflow is clearly low (OECD Education Database). Therefore, the Korean government has increased its efforts in attracting foreign researchers with its so-called "World Class University Programme" (Kang 2008, December 1). Over the next five years, around USD 800 million will be invested in supporting universities to build new research departments around leading academic superstars, who will take up visiting posts. Complementary to these measures, Korea has three preferential visa programmes for foreign scientists and engineers: the Science Card, the Gold Card, and the IT Card. Recipients of the Science Card programme receive a five-year multiple-entry visa, regardless of country of origin, and beneficiaries of the Gold Card, and IT Card obtain a three-year multiple-entry visa (Park 2007, March 28). From 2000 to 2006, 2,260 foreign HRST benefited from these preferential visa programmes (OECD, 2007c:249).

In addition to attracting already established researchers, the Ministry of Education, Science and Technology has also started programmes to attract more foreign students. In 2004, the so-called "Study Korea Project" was launched (Ahn 2010, July 21). It provided scholarships to 1,500 students from developing countries in 2008, a figure that is set to double by 2012. Furthermore, the Study Korea Project Development Plan seeks to double the number of foreign students in Korea to 100,000 by 2012 and to diversify their countries of origin (OECD, 2007c:250). Until recently, most of Korea's international students were either from China or Southeast Asian countries (OECD Online Education Database). The government also expects positive impacts on Korea's economic and diplomatic development. For the former, a reverse of the low fertility rate and rapid population aging are hoped (OECD 2007d:1-7).

Despite these broad sets of measures in attracting foreign students and established researchers alike, potential cultural and language barriers remain that could make Korea a less attractive place to live and work for foreigners. The increasing use of English in Korean research centres will help overcome these obstacles, but it will take a considerable length of time until a substantial number of university courses are offered in English (Jamber 2009). Referring to culture, getting fully accepted by and absorbed into Korean society still seems to be a difficult task for foreigners residing in Korea to accomplish. How the tolerance level has changed over the last few years and in which Korean provinces the issues of tolerance and discrimination seem to be more severe, is subject of the next chapter.

2.2.3 Hard Data on Tolerance

Whereas the interest of internet users residing in Japan in discrimination issues does not show a great deal of fluctuation during each year, the ups and downs in Korea's case are quite substantial. Overall, the search interest in discrimination and tolerance issues in Korea seems to be considerably higher than in Japan. An average 59 on the normalized scale in comparison to the above assessed 49 for Japan supports this claim. Two peaks in interest can be found in April 2005 and May 2006, and the the lowest request for information on discrimination can be dated to September 2010. If we look at the search pattern for the last 12 months between November 2009 and October 2010, the fluctuations come to light immediately. Whereas interest reached its peak in November 2009, it fell rapidly during December and January of the next year. In the course of the next months until October 2010, the fluctuations repeated but were not as large as in the winter months before. If we compare the charts on a yearly basis, they shows no seasonal pattern.

Fig. 13: Interest in “discrimination“ over time - 01.01.2004-28.10.2010



Note: The data is normalized and presented on a scale from 0-100

Looking at the results broken down by regions and Korean provinces respectively, it comes as a surprise that Google users from only two Korean provinces spent a considerable amount of sending search requests to the Google mainframe. Not surprisingly, Korea's economic heartbeat Seoul is at the top of the list. Second and, therefore, placed last behind Seoul is the province Gyeonggi-Do, where 23 percent less interest was registered than in Seoul.

Fig. 14: Top Searches Terms on “discrimination“ - 01.01.2004-28.10.2010

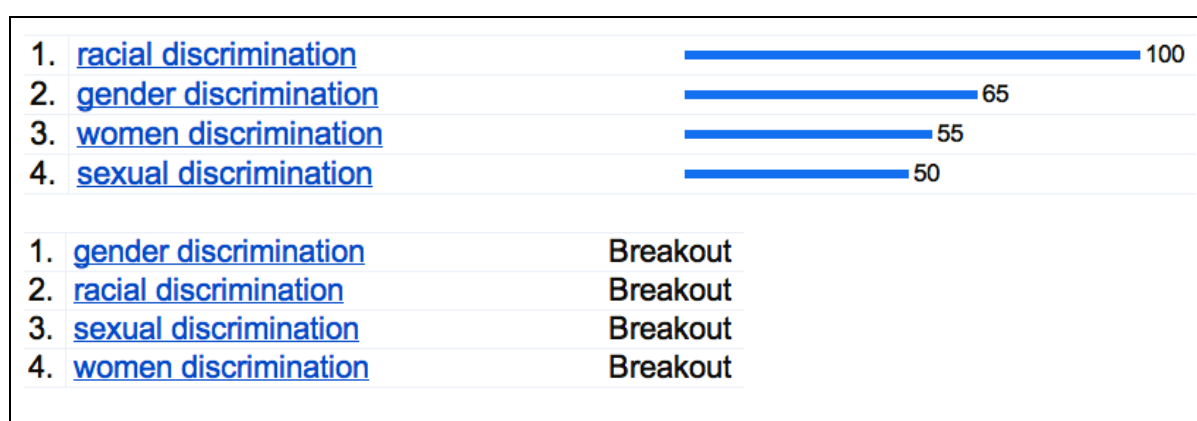
Note: The data is normalized and presented on a scale from 0-100

Source: Google Insights for Search

What can we learn from these results if we compare them to the numbers of registered foreigners living in Seoul and Gyeonggi-Do? According to a recent survey by the Seoul City government from 2009, foreigners account for 2.4 percent of the total population in Seoul (Seoul Statistics 2010). Foreigners numbered around 255,000 whereas Seoul's total population accounts for 10.45 million people. The numbers represent a ten-fold increase from the 51,000 registered in 1998. Chinese residents, by far, account for the largest share with 75.5 percent of the foreign population in Seoul, followed by Americans with five percent and Taiwanese with 3.5 percent. Japanese stood at 2.7 percent and Vietnamese at 1.8 percent. Broken down by labor and status respectively, the number of migrant manual workers stood at 58.5 percent, married immigrants at 11.6 percent, students at 7.8 percent and professionals at 4.1 percent. Whereas the number of foreigners living in Seoul has increased each quarter of the year since 2005, the figures decreased in May 2010 for the fourth consecutive quarter, mostly due to the declining population of ethnic Chinese, the Seoul metropolitan government announced. The number of foreigners had been increasing at an average of 18.11 percent a year until last year. According to the officials, the decrease can be viewed as a reflection of the slowed domestic economy (Seoul Statistics 2010). Seoul is in the heart of the Gyeonggi-Do province, but since 1946 a politically separate entity (City Government of Seoul). Gyeonggi-Do is by far the most densely populated province in South Korea (Provincial Government of Gyeonggi-Do). The populations of Seoul, Incheon and Gyeonggi-Do make up almost half of the entire population residing in Korea with 48.5 million (Statistics Korea 2010). Since the 1990s much has been invested in the building of satellite cities to absorb the demand for living space (Kim and Choe 1997:192). Due to the lack of available housing in Seoul, many people decide to live in Gyeonggi-Do province, both natives and foreigners (Kim and Choe 1997:192). In 2008, a

total of 277,991 foreign residents were living in the province of Gyeonggi-Do, an increase of 29 percent from 2007 (Provincial Government of Gyeonggi-Do). They account for 2.5 percent of the total population of the Province and 31.2 percent of the total foreign-resident population of the country (891,341), making Gyeonggi the province with the largest foreign-resident population. Between 1998 and 2008, the population has increased by an annual average of 23,381, and the rate of increase is expected to rise further in the coming years. When broken down by labor and status, workers with a total number of 62.3 percent account for the largest share. The number of immigrants by marriage and their children 50,526 people or 18.2 percent of the foreigner population residing in Gyeonggi-Do. Students, language instructors and other foreigners are a less visible group than workers but still account for a considerable share of 19.5 percent. Broken down by nationality, Chinese account for the largest proportion with 56.1 percent, followed by the Southeast Asian states, Vietnam, the Philippines, Thailand, Mongolia, and Indonesia. Men account for 58.3 percent while women make up 41.7 percent. Among workers, 70.2 percent were men while 86.5 percent of the immigrants by marriage were women (Provincial Government of Gyeonggi-Do). Google's listing of Seoul City and Gyeonggi-Do as the only places from where a considerable number of search requests for discrimination were sent, corresponds with the actual numbers of foreigners living in both these areas. As noted before, most of the foreigners living in Korea are concentrated in these two areas.

Fig. 15: Top Searches Terms and Breakouts⁸ on “discrimination” - 01.01.2004-28.10.2010



Note: The data is normalized and presented on a scale from 0-100

Source: Google Insights for Search

⁸ **Breakout** indicates that the search term has experienced a change in growth greater than 5000 percent.

Looking at the top searches and so-called breakouts in Figure 15, which show a rise in interest of over 5000 percent, a similar pattern between Korea and Japan can be diagnosed. In Korea as well in Japan, discrimination against other ethnic populations and women were the most frequently typed terms related to discrimination. One difference between Korea and Japan is that the issue of age discrimination does not seem to play as significant a role in Korea as it does in Japan because it is neither listed in Korea's Top Searches nor in the "Breakouts." That "racial discrimination" is listed at top of the searches related to discrimination and has experienced an over 5000 percent increase in search requests since 2004 as have the semantically identical terms "gender- women- and sexual discrimination" indicates that Korea's tolerance level has not improved or even deteriorated in the course of the last six years.

To sum up, "Google Insights for Search" provides for the assessment of Korean society's tolerance level three main findings:

1. The level of discrimination seems to have been deteriorating since 2004.
2. Discrimination in Korea tends to be mainly an issue in Seoul City and Gyeonggi-Do.
3. As in Japan, discrimination against women seems to be on the rise in Korean society.

2.2.4 Conclusions

Overall Korea has manifested its reputation as a country associated with the East Asian miracle. Similar to Japan, Korea is one of the leading countries in R&D intensity and has performed exceptionally well in a number of areas in which it is regarded as the leading country such as information and communications technology. But, like in Japan, with respect to high investments, the outcome has not been satisfying in all areas, which again can partly be attributed to the low level of international collaboration (OECD 2008a:135). The high numbers of graduates in science and engineering majors may indicate that Korea does not need to rely on the capacities of foreign HRST, but this conclusion proves to be wrong to the extent that Korea's innovation system would rather need more graduates at the M.A. and Ph.D. levels than the current oversupply of basic college graduates could possibly

compensate. Likewise, in Japan, the number of incoming students and foreign HRST is relatively low but in contrast to Japan, the outflow of Korean students, especially to the United States is substantially higher. Although these students represent a tremendous potential for Korea's S&T sectors, Korea is not able to unleash it, owing to the unwillingness of Korean HRST to return to Korea at least for the first few years following their graduation. In accordance to this trend, Korea also lacks the ability to import foreign expertise. Currently, Korea is in danger of deteriorating its native science base. In order to prevent this, the Korean government has started a number of initiatives to attract both students and world class researchers, including preferential visa programmes for foreign HRST. In terms of tolerance, issues related to discrimination seem to be more severe than in Japan. Even more worrisome is the fact that the number of search requests has risen steadily since 2004, which indicates that discrimination is on the rise in Korean society. The comparison between the regional distribution of requests, on the one hand, and the share of foreigners living in Korean provinces, on the other, shows that of the two most densely populated regions in which the majority of foreigners live, Seoul and Gyeonggi-Do, the level of discrimination seems to be the highest in Korea. In terms of top searches and breakouts, interest in racial and gender discrimination has risen more than five-hundred-fold for the period since 2004.

In summary, the findings we gained by applying "Google Insights for Search" substantiate the hypothesis that foreigners will likely look for information on Google if they are confronted with discrimination. The fact that Google's share in the search engine market in Korea accounts for a modest five percent, together with Google's displayed regional distribution coming only from the two most densely populated regions in which most foreigners live, makes Google a reliable tool in displaying foreigner's frustration about discrimination in Korea. Referring to the central research question, whether there exists a potential connection between Korea's tolerance level and its ability to attract foreign HRST, three worrisome trends may suggest a relationship:

- Korea's tolerance level has deteriorated since 2004.
- The stock of foreign HRST has stagnated since 2000.
- The number of Korean recipients of doctorates from US universities in science and engineering fields who are planning to return to Korea, has rapidly declined since 1997.

2.3 HRST and Tolerance in China

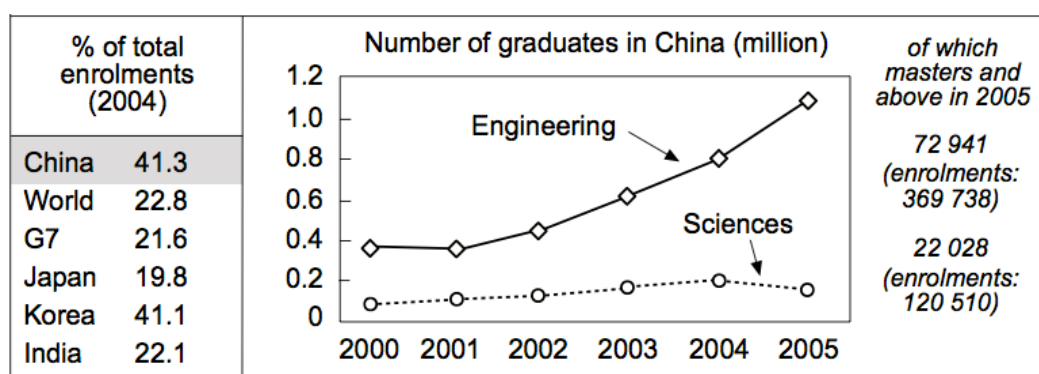
China has relied to a substantial degree on technology imports from abroad (Simon et al. 2007), and the building and development of its scientific and technological capabilities have lagged behind its economic growth until recently (OECD 2008a:32). This trend was reversed towards the end of the last decade and since then, major efforts in developing the country's innovative capabilities have been undertaken (OECD 2008a:32). Despite the geographical proximity and overall successful economic records of China's neighbours Japan and Korea, China has not replicated the same strategies but instead made international openness a cornerstone of its overall development strategy (Tisdell 2009:285). This decision to follow a different strategy is owed to China's unique initial economic conditions such a large agricultural labor force, low subsidies to the population, and a rather decentralized economic system (Sachs and Woo 1993:139-141; Qian and Xu 1993: 135-70). Furthermore the absence of an appropriate financial system and insufficient access to distribution networks made a Chinese growth model necessary (OECD 2008a:35). However, according to the OECD, China's opening to foreign investment has not been motivated by an insufficient domestic savings rate but rather on the expectation of Chinese policy-makers that the by establishment of a market for technology consisting of FDI, foreign trade, and technology transfer will contribute more to modernisation of the economy (OECD 2008a:35). The effect has been that China has gained access to advanced technologies, to management practices, and to a wide range of skills (Marcotte and Niosi 2000:55). In China, companies with foreign investment are basically less R&D-intensive than domestic firms (Jin 2010). Still, there is a quite substantial difference in R&D intensities in the computer, office equipment, electronics, and telecommunication industries (MOST 2007). This has contributed to a perception that technology transfer to China and subsequent spillovers to the domestic economy have shown mixed results (LAI et al. 2006:316). Potential factors that might have limited the spillovers are a lack of absorptive capacity in Chinese firms or a lack of effective intellectual property rights protection (LAI et al. 2006:316; OECD 2008a:35). The disappointment about the outcomes is rooted in the fact that China's input to innovation is already comparable with those of major players in Science and Technology (Duchêne 2007:1). Since 2000, China has ranked second in the world after the United States and ahead of Japan in its number of researchers. Since 1995, R&D spending has increased at an annual rate of almost 19 percent. The R&D/GDP ratio has more than doubled within a decade and accounted for 1.42 percent in 2006 compared to 0.6 percent in 1995. Despite this rapid improvement in terms of input,

China's innovation capabilities have not reached the level of OECD countries that have a similar R&D intensity of production. Thus far, a large proportion of the resources invested in R&D have been devoted to building the infrastructure of the innovation system; however, the stock of intellectual capital has not grown as quickly (OECD 2008a:49). Raising the stock of intellectual capital can either be achieved by raising the number of students graduating from universities or improving the incentives targeting foreign HRST.

2.3.1 Status Quo of HRST

China has taken tremendous measures to mobilise its human resources in order to upgrade the technological level of its economy (Heckman 2005:60). Since 1990 China has made substantial progress in developing HRST (Mu 2007). The HRST stock amounted to 12.2 million in 1990 and reached 38.5 million by the year 2003, of which persons with a university degree or diploma accounted for 14.4 million people. Likewise, the number of HRST per thousand population tripled from an average 10.8 in 1990 to 29.8 HRST in 2003 (OECD 2008a:317). However, in terms of HRST as a share of the population, China lags significantly behind the OECD average (OECD 2008b:52).

Fig. 16: HRST Graduates in China



Source: National Bureau of Statistics, *China Statistical Yearbook 2006*

Undergraduate and postgraduate enrolments in the fields of science and engineering remain stronger at Chinese higher education institutions than in other OECD countries, with the exception of Korea. However, the share of science and engineering degrees in the tertiary education system has been falling since 2000. Since 2004, the absolute number of

undergraduate degrees in science has even declined (OECD 2008a:52). In respect to China's ambitions in R&D, this is worrying. Although China generally has managed to build a substantial stock of R&D personnel, the efficiency of the current workforce is not as high as expected. For instance, the numbers of science and engineering articles published (Lu 2004:120) and patent applications in China are significantly lower than in advanced economies (OECD 2008a:168). In addition, there are also tensions in a number of labour market segments for various levels of S&T-related jobs, which show human resource shortages in the innovation system (OECD 2008a:47). As a consequence domestic firms are competing against foreign firms in recruiting scarce talent with managerial skills or HRST in industry-relevant fields. Until recently foreign companies have been more successful in attracting both, domestic and foreign talents but since domestic and in particular State Owned Enterprises (SOE) started to adjust the working conditions for prospective talents and HRST, more and more Chinese graduates chose to work in domestic firms (Wu 2008:173). However, foreign companies are still the more popular employer among foreign employees. Besides the fact that there seems to exist a general shortage of highly qualified and innovation-oriented technicians and technical workers in many industries, the pressing question that arises is why foreign firms are more successful in recruiting scarce talent than domestic ones? It can probably be owed to the higher salaries that foreign companies provide. Also, foreign firms could be better at establishing a more tolerant and free working environment, which would help workers, along with other factors, to work more efficiently. If this assumption is true for the institutional level, why not also for the whole society?

The status quo of the Chinese HRST has improved substantially in the course of the last years, but bottlenecks in the HRST supply in combination with an already declining rate of science graduates, leaves Chinese policy-makers no option other than formulating strategies to attract more foreign HRST and, in China's case, luring back Chinese HRST who currently reside abroad.

2.3.2 Strategies for attracting HRST

International mobility is an important aspect of the Chinese HRST ecosystem, given the large number of students enrolling in courses abroad. China is a key player in the global competition for talent, mostly on the supply side. However, out-migration is much higher than return migration. OECD countries are making significant policy changes to raise their ability to attract foreign students and researchers. While this may be favourable for China in terms of the number of students receiving advanced training, it is essential for effective policy measures to address return migration of highly qualified Chinese, who have either received their training abroad or/and have gained substantial work experience outside of China (OECD 2008b:343). The government has tried, through a number of measures, to transform the current “brain drain” into a “brain circulation” that would help to achieve national goals (Saxenian 2003:24). Since 2000, China’s government has started a series of initiatives to make returning more attractive for scarce Chinese talent by loosening restrictions. For instance, special permits for entering and leaving the country are granted so that returnees can continue to work abroad and also work in China (Bail and Shen 2008:22). They may also be permitted to remit their after-tax earnings, a right that has been exclusively reserved to foreigners working in China (Bail and Shen 2008:10). Talking about tax benefits, there is already some interregional competition, in particular between Beijing, Shanghai, Shenzhen and Guangzhou, to attract returnees through tax reductions or even exemptions, favourable import regulations and/or financial support to start-ups (OECD 2008b:54). In accordance with these measures, the building of development parks and incubators has been intensified. In 2003, forty-five incubators dedicated to returned overseas scholars hosted about 3,000 enterprises employing more than 40,000 people (OECD 2008b:54). In addition to central governmental policies, the provincial and regional governments also introduced local measures to provide more incentives for the return of overseas Chinese graduates (Zhu and Zhao n.d.:34-41). For instance, incentives to attract overseas IT experts and graduates are usually made at the provincial level. These include permanent residency for the returnee’s family, access to schooling for children, subsidies for purchase of the first home or car, stock equity awards, and low rents for returning overseas students” (Saxenian, 2006:206). Due to the desire to enhance local economic development inter-city competition for the highly qualified and skilled is fierce. More recently, state-owned enterprises have also engaged in the competition for highly skilled returnees (Zweig, 2006:202). Complementary to these measures, the Chinese governments is currently working on setting a number of

communication platforms for two channels (OECD 2008b:341): First, between mainland and overseas Chinese S&T workers and students and second, between Chinese regions, government agencies and various overseas Chinese groups. The building of an online platform and database of overseas Chinese graduates has been developed to unburden the return of overseas Chinese graduates. Besides measures in attracting Chinese talent back home, the Chinese government has implemented policies to attract talented foreigners to work at universities, research institutes and enterprises or to establish their own businesses in China. This strategy was outlined by the Ministry of Personnel, which is also promoting the return of highly-skilled Chinese graduates (Yang et al 2004:302).

Recently, the number of returnees has started to increase. If and to which extent this can be attributed to the government's initiatives is hard to verify. However, the number of returnees is still too low to meet the current and prospective demand of certain types of skills. According to the OECD, in the foreseeable future the main determinants of inflows and outflows of highly qualified Chinese labour will continue to be international differentials in wages, working and living conditions, and entrepreneurial opportunities (OECD 2008b:54). Despite China's comprehensive efforts at increasing its human capital, it needs to develop a strong science and innovation system that is connected to the global system. Due to the fact that human mobility is a central element of globalisation, China is well advised to build a national innovative environment to attract the highly skilled back to China and foreign talent to China respectively. Both, returnees and foreigners are looking for an environment to develop their talent further (OECD 2008b:341-342). It can be assumed that these very same determinants are also true for foreign HRST. Since tolerance in society is a decisive factor in shaping the working and living environment, we turn to the assessment of China's tolerance level.

2.3.3 Hard Data on Tolerance

The graph in Figure 17, shows the interest level on issues related to discrimination by users residing in China, is compared to Japan's and Korea's the probably most remarkable one. A number of repeating fluctuations appear throughout the period 2004-2010.

Fig. 17 Interest in “discrimination“ over time - 01.01.2004-28.10.2010



Note: The data is normalized and presented on a scale from 0-100

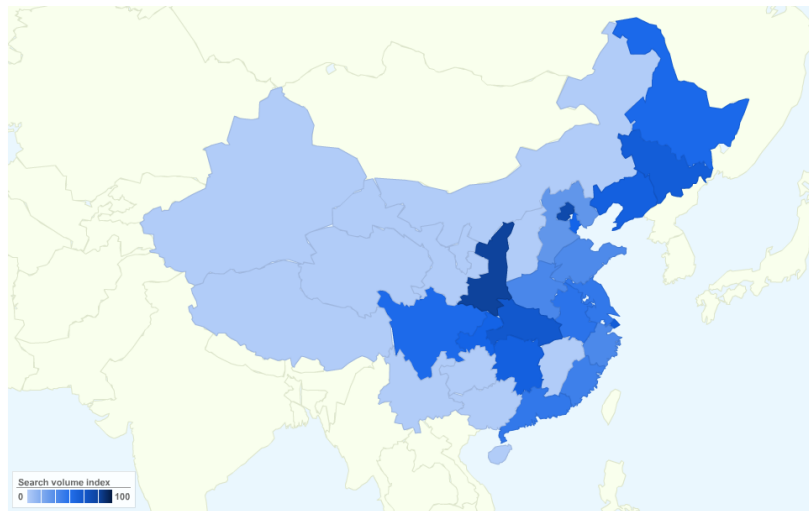
First, each year two main peaks can be identified clearly. The first one tends to happen in the second quarter of the year during April or May. The second peak can be found without exception in December for the period 2004-2009. Looking at the right end of the graph that ends with October 2010, which is the month this graph was requested, shows a clear tendency upwards which indicates that the next peak will probably be seen in December 2010 as it has in all past years since 2004. Another striking pattern, that shows the same degree of consistency, are the low points, marking a lower interest level among users residing in China looking up information for discrimination. Like the peaks, the low points also number two. They naturally follow in time before and after the high points. The first one tends to show in the third quarter of each year during the months July and August. The second low level in interest can be seen without a single exception in February of each year between 2004 and 2010. All in all the fluctuations show a remarkably consistent pattern through out the whole period which makes a case of coincidence highly unlikely. On the contrary, the high level of consistency of fluctuations in the course of each year indicates that systematic or structural factors could be responsible for the searching pattern among Google users in China. Looking at the specific months when the lowest and highest marks in the interest level show, it appears that traditionally busy and work-intensive periods, on the one hand, and more relaxing times

like holidays in the course of the year, on the other hand, are responsible for this pattern. For instance, during the days of the Chinese New Year Festival, which is the most important of the traditional Chinese holidays, the bottoms of the graph always appear in February which is the exact period of time when the Chinese New Year Festival is going on. Likewise, during July and August, when children, students and families tend to go on holiday, the interest level in searching for information about discrimination on the web is significantly lower. Complementary to this pattern, the interest level reaches its peak during April/May and without exception in December which are characterized by intensive work.

What conclusions can we draw from this? Based on the fact that search requests for discrimination in the web depend on seasonal factors such as holidays, does this mean that people feel less discriminated against during holidays and more discriminated against during periods of intense work? This hypothesis holds true to the extent that the probability of being discriminated against rises with the number of personal interactions a person has within his or her social environment. Naturally, this is true for periods when people work or study. This hypothesis appears even more likely when we compare the social setting in times of holidays and periods of work respectively. During holidays, people tend to visit their families and extended families respectively. In such a social environment, feelings related to discrimination are more likely to happen at work than they are with family members.

However, looking solely at the pattern in search interest in discrimination over time does not provide any information about the users residing in China. For our purposes of finding indications that the requests related to discrimination sent to Google were possibly coming from foreigners, it is hard to achieve this due to the scarce availability of data on foreigners and immigrants at the provincial level in China. Fortunately, the Chinese government is currently collecting data on foreigners and immigrants residing in Chinese provinces in the course of a national census. The results are expected to be published in the fourth quarter in 2010 and will be used for a revision of this chapter.

For the purpose of finding potential relations between the number of requests related to discrimination and other factors on the provincial level, we take a look at a number of available data sets for those provinces, which Google has identified as more interested in issues related to discrimination.

Fig. 18: Regional Interest in “discrimination” - 01.01.2004-28.10.2010

Note: The data is normalized and presented on a scale from 0-100

Source: Google Insights for Search

Unlike Korea, where a considerable number of requests were sent from only two regions, the interest in discrimination in China is regionally more distributed than in Korea. The requests are heavily concentrated in central and southeast China and along the east coast of China. The distribution of research requests across China basically reflects the current per capital income disparities between regions. Economic development has generally been more rapid in coastal areas than in the interior. The three wealthiest regions lie along the southeast coast, the east coast and near the Bohai Gulf, in the Beijing-Tianjin-Liaoning region. The province Shaanxi in the middle-north of China is listed at the top, followed by Beijing, which shows just eight percent less interest in issues of discrimination. The other eight listed provinces stand relatively close to each other in terms of search interest. Taking the main constraint of unequal distribution of internet access as well as the lower search engine market share of Google in China into account, we look at various regional data sets and try to uncover relevant relationships to Google's nominalised numbers of the top ten provinces for the term “discrimination.” The correlation matrix in Table 3 illustrates the degree of connections.

Table 3: Descriptive Data on Google's Top Ten provinces for "discrimination"

	Beijing	Chongqing	Hubei	Hunan	Jilin	Liaoning	Shaanxi	Shanghai	Sichuan	Tianjin
Population¹ (million)	22	31,442,300	57,110	63,800	27,340	43,147	37,620	19,210	81,380	11,760
Density/km²¹ (thousand)	1,309	0,379	0,324	0,316	0,145	0,289	0,180	0,2747	0,1799	0,859
Nr. of Internet Connections² (million)	6,68800	2,483941	5,311230	4,083200	2,734000	4,918758	3,987720	5,513270	6,835920	2,928240
GDP¹ (US\$ million)	173,707	95,575	187,842	189,294	105,448	220,547	107,828	218,137	207,163	109,805
GDP p.c.¹	10070	3355,00	3157	2961	3848	5006	3181	11361	2538	9136
Human Developmental Index³	0,891	0,783	0,784	0,781	0,815	0,835	0,8	0,908	0,763	0,875
GOOGLE⁴	92	65	80	69	76	63	100	69	64	74

Source: ¹Chinese Statistical Yearbook 2009, ²Statistical Survey Report on the Internet Development in China 2007, ³United Nations Development Programme China 2010, ⁴Google Insights for Search

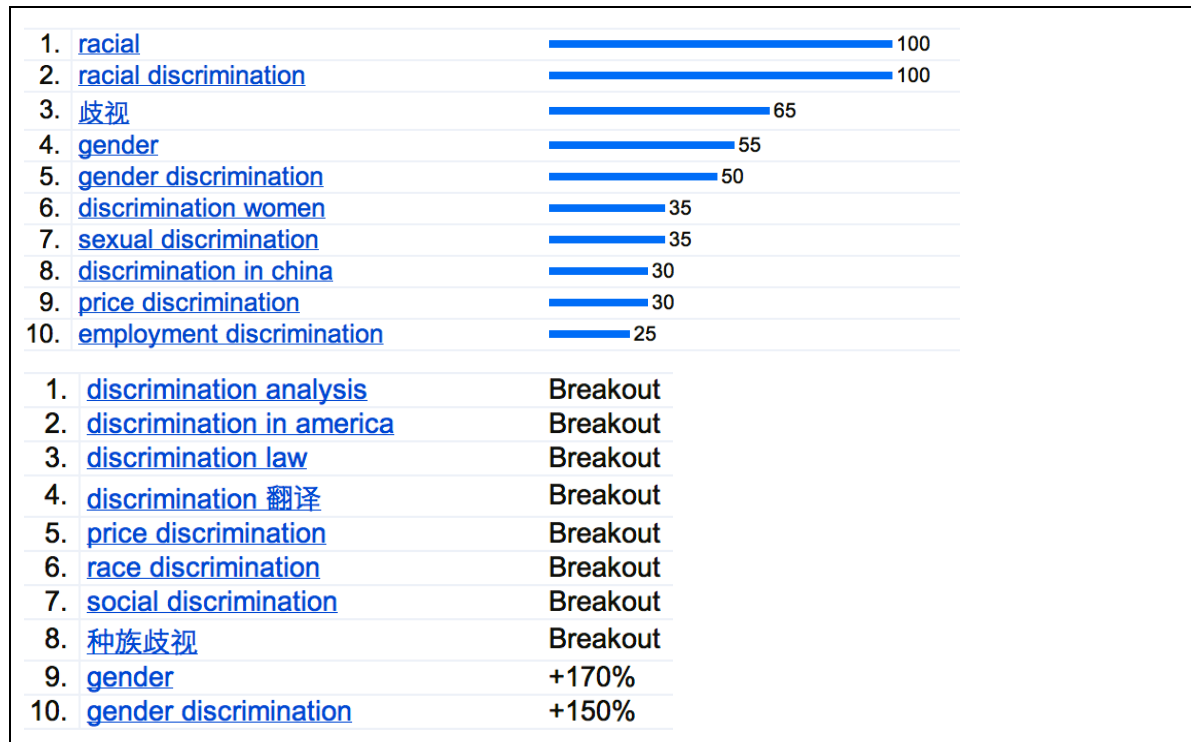
Table 4: Correlation Matrix

	Population (million)	Density/km2 (thousand)	Nr. of Internet Connections (million)	GDP (US\$ million)	GDP p.c.	Human Developmental Index	GOOGLE
Population (million)							
Density/km2 (thousand)	-0,513235998						
Nr. of Internet Connections (million)	0,407799259	0,549437521					
GDP (US\$ million)	0,459592123	0,569796564	0,785079321				
GDP p.c.	-0,71029975	0,938800331	0,119583683	-0,09751739			
Human Developmental Index	-0,783200953	0,884096418	0,033945433	-0,127625547	0,964214167		
GOOGLE	-0,280663113	0,01988856	0,080197953	-0,363461631	0,286819875	0,340377042	

Besides expected strong and robust correlations between economically related factors such as the Human Development Index, GDP per capita and population density, the Google numbers do not show any significant correlation to any one of these factors. What comes as a surprise is that there does not even seem to be a strong relationship between the number of Google research requests and the number of internet connections in these ten provinces. Google's modest market share in China in combination with the relatively small numbers of foreigners may have contributed to this result. Overall, we can conclude from the correlation matrix that

Google is used more in the developed regions of China. If foreigners actually looked for information about discrimination or not, may be answered by the list of top searches.

Fig. 19: Top Searches Terms and Breakouts on “discrimination” - 01.01.2004-28.10.2010



Note: The data is normalized and presented on a scale from 0-100

Source: Google Insights for Search

Besides the central terms „racial and gender discrimination,“ which were most frequently requested in China as they were in Korea and Japan, one obvious difference in China’s top searches is the fact that a considerable number of searches were also typed in Chinese characters as shown in Figure 19. The fact that 歧视, the Chinese translation for discrimination is ranked at position ’3’ among top searches can be interpreted to the extent that members of ethnic minorities who are naturally Chinese native speakers are facing discrimination and therefore use Google to get information on this issue. However, it also could just be the fact this translation was used by Chinese speaking social scientists who were conducting desk research. This assumption becomes more substantive if we look at the breakouts, describing terms that have risen in popularity of over 5000 percent for the period 2004-2010. The first two listed breakouts “discrimination analysis” and “discrimination in America” are supporting signs for this claim. In contrast to Japan and Korea, issues of gender

discrimination and discrimination against women respectively have not grown as fast in interest among Google users in China as those using Google in Japan or Korea.

Overall, “Google Insights for Search” provides for the assessment of Chinese society’s tolerance level in three main findings:

1. The overall level of discrimination seems to have improved since 2004 at least for the more developed provinces in China.
2. The degree of discrimination or how strongly discrimination is perceived depends on annually occurring seasonal events such as holidays and work-intensive periods.
3. The issue of discrimination seems to be a subject of interest for both researchers and private people alike.

2.3.4 Conclusions

Until recently, China’s development of its scientific and technological capabilities had difficulty in keeping pace with its rapid economic development in the last decades, but this has changed. China has invested heavily in S&T and is following a more aggressive and open strategy than Korea or Japan. In absolute numbers, China performs quite well but in relative terms is still below the OECD average. Whereas the number of researchers in China is the second highest in the world, second only to the USA, where more researchers conduct their work, the share of HRST in the total Chinese population is far below the average of advanced countries. Similar to its neighbours, China’s output productivity in terms of scientific paper publications and patent applications from its native HRST has not reached the leading benchmark level. More worrisome for China is the fact that the number of science and engineering degrees in its tertiary educational system has been falling since 2000, which will likely intensify tensions within the Chinese innovation system. Basically, China has invested heavily in the development of capital intensive technological infrastructure, but the growth of HRST has not grown as quickly. Although undergraduate and graduate enrolments in the science and engineering fields are higher than the OECD average, severe human capital shortage

still exist in S&T. One major strategy the central and local governments are pursuing is to attract a large number of Chinese HRST who are currently working and studying abroad. In order to attract both foreign and Chinese HRST, China needs to establish an attractive working and living environment, which supports people developing their talents. In terms of tolerance level, the overall tolerance level seems to have improved, at least in those provinces where a considerable number of Google users exists. One major discovery that has been made possible through "Google Insights for Search" is that the level of discrimination depends on seasonal and annually occurring periods such as holidays and work-intensive periods. During holidays, the number of search requests for discrimination is clearly lower than in times when people are typically busy working. The regional distribution of requests corresponds with the degree of development in Chinese provinces. Requests from Google users tend to be more frequent in central and eastern China. Owing to the lack on available data on the number of foreigners living in Chinese provinces, a correlation analysis with Google's numbers for the top search regions and a wide range of different data sets was conducted. However, the resulting correlation matrix did not show significant connections between requests for information on discrimination and other factors in Google's top search regions.

All in all, it seems that the issue of tolerance and discrimination towards foreign HRST in China is less severe than in Korea or Japan. The trend that the overall level on search requests for discrimination has decreased since 2004 supports this claim. Furthermore, the whole economy in general and the innovation system in particular is wide open for foreign and overseas Chinese HRST. In order to ensure and extend the national absorptive capacities that are essential for technological transfer from abroad, China needs to intensify its efforts in accelerating the production of highly educated home-grown talent, while maintaining the quality of its graduates.

After the country-centered analysis of the general situation in S&T, flows of HRST, strategies to them, and the revelation of the respective tolerance levels in all three major East Asian states, the subsequent comparative analysis aims to outline the main differences and similarities between Japan, Korea, and China in terms of HRST and tolerance.

3 Analysis

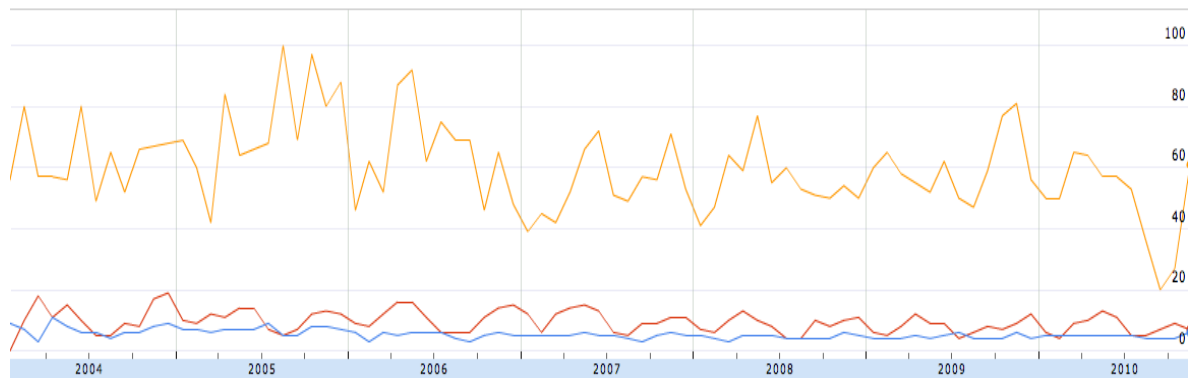
The analytical comparison of Japan's, Korea's and China's innovation system reveals a number of common features. First and most obvious is the high level of R&D intensity in all three East Asian states. S&T is a priority on the national governments' agendas, and this is reflected by the fact that the level of investments is above average of other leading advanced countries. However, all three countries show mixed results to the extent that the high R&D intensity has not brought satisfying results in all areas. For instance, the number of scientific publications and patent applications is below the OECD average. Whereas the reasons for Japan and Korea can be found in the low level of cooperation with the international scientific community and foreign partners respectively, in China the low productivity is partly due to China's still weak scientific and technological base. Another worrisome feature that all three East Asian states have in common is that based on the current and prospective number and qualification level of science and engineering graduates, they will not be able to fill the already existing gap between supply and demand for HRST, not to mention satisfying rising future demand. Two current developments are responsible for the HRST shortage in the East Asian innovation ecosystem. First, fertility rates in Japan and Korea are considered to be the lowest in the world, and China is already showing the first signs of a consistently aging population. This poses major challenges for the whole society to the extent that as time goes by, the share of employed people who pay taxes in order to sustain pensioners are becoming increasingly few. Along with that, the share of potential persons who would consider enrolling in a science or engineering field is decreasing as well. In the face of these demographic pressures and HRST bottlenecks, the East Asian governments have started various measures to attract foreign and/or national HRST who are working and studying overseas. Whereas Korea and China, owing to the high level of Korean and Chinese HRST outflows, are trying to attract both national and foreign HRST, the Japanese government's policy measures only address foreigners. Since Japan's student and HRST outflows are much lower than in Korea and China, this is reasonable. Still, the fact that Japan's innovation system and human capital formation system is almost entirely national in its nature, indicates that Japanese people tend to have less interest in discovering foreign cultures and, therefore, are naturally less equipped for communicating in an intercultural working environment. In addition, the high number of Korean and Chinese HRST who have spent a considerable amount of time working in a foreign country are likely to be better connected with foreign professionals, which presents a

substantial advantage in the diffusion of knowledge. Until today, however, the Korean and Chinese governments continue to struggle to attract their overseas high potentials back home.

If we look at the contributing factors as to why the ability to attract HRST back is rather modest in all three East Asian countries, two patterns become visible. First, current working conditions at the recent stage are not attractive enough for the majority of foreign HRST. Due to the fact that East Asian researchers have not yet built the reputation of world class researchers, reflected in the relatively low productivity rates for scientific papers and applications for patents as well in the low levels of collaboration with foreign colleagues. In addition, the overall scientific and technological base seems to be weaker than in other advanced countries. The second pattern all three countries have in common is the unattractiveness of living conditions in Japan, Korea, and China. Currently, these conditions do not seem to justify the social and economic costs of moving to one of these countries for foreign HRST and, in particular, for non-Asian HRST. Contributing factors, among others, are the language barrier, few professional opportunities for spouses, and a less-optimal environment for raising and educating children. One major factor that influences the living environment and quality of life respectively but until now has been difficult to measure, is tolerance.

Despite a number of methodological constraints such as a relatively low search engine market or unequal distribution of internet connections across provinces, the application of “Google Insights for Search” has delivered a wide range of relevant data on tolerance and discrimination in East Asian societies. In the trend analysis for each country, Google’s data indicate that while the tolerance level has not changed significantly in Japan and even has improved in China, at least in the more developed provinces, the overall tolerance level has deteriorated in Korea since 2004.

Fig. 20 Interest in “discrimination“ over time - 01.01.2004-28.10.2010 for Japan, Korea and China



Note: The data is normalized and presented on a scale from 0-100

If we let Google conduct a direct comparison of the trends broken down by all three countries for the period 2004-2010, the yellow lines showing search requests coming from Korea, indicate that Google users in Korea are clearly more interested in issues of discrimination than Google users in China (red line), or Google users residing in Japan (blue line). The average number of searches coming from Korea amounts to 60 on the normalized scale, whereas the average number in China amounts to nine and in Japan at only five. These results may lead to the false and dangerous conclusion that China is more tolerant than Korea but less tolerant than Japan. The “Google Insights for Search Help” clarifies that “the numbers on the graph reflect how many searches have been done for a particular term, relative to the total number of searches done on Google over time. They do not represent absolute search volume numbers, because the data is normalized and presented on a scale from 0-100. Each point on the graph is divided by the highest point, or 100. When Google does not have enough data, zero is shown. Since the internet penetration rate in China is much lower than in Korea and Japan, final conclusions about China’s tolerance level may not be drawn on the basis of Figure 20; however, from Japan’s and Korea’s clear difference in relative search requests, we can interpret that discrimination especially against foreigners seems to be more severe in Korean society than in Japan. This finding can also be attributed to the fact that foreigners with a share of 1.22 percent of the total population are substantially less represented and visible than foreigners in Korea who account for only 2.2 percent of the total population. Another major finding, which “Google Insights for Search” provides is the remarkable seasonal pattern on search requests in China. Depending on annually occurring periods such as holidays and work-intense periods, the interest in discrimination either decreases rapidly during holidays or

increases rapidly during work-intensive months such as April, May and December. Furthermore, the top searches and breakouts in China reflect that, besides private individuals, a considerable number of social scientists also use Google for their research on discrimination. The top searches and breakouts in Korea and Japan indicate that discrimination against women is still a worrisome obstacle that needs to be overcome in both societies.

All in all, the application of “Google Insights for Search” has proved to be a major step forward in the attempt to measure and quantify social phenomena such as tolerance and discrimination. In the face of the identified still inadequate working and living environments for foreign HRST and the not yet improved situation on discrimination against foreigners, the central hypothesis of this work suggests that

due to the lack of tolerance in East Asian societies, global talents and highly qualified foreigners choose to live and work in more tolerant places, outside East Asia.

This has been **proven to be true** to the extent that the considerable level of discrimination against foreigners has contributed, among other factors, to a less attractive working and living environment in East Asian societies. Therefore, with the current status, the economic and, in particular, social costs of moving to East Asia, either alone or with family, seem to be too high for foreign HRST.

In the presence of this finding, how can the already initiated policy measures do attracting global talent be evaluated? Basically, the East Asian governments have concentrated predominantly only on improving the working conditions for HRST but have paid insufficient attention to the improvement of the living environment in general and to the establishment of an open and tolerant society in particular. As long the East Asian governments do not initiate measures for educating the public about the benefits and urgency of intercultural understanding and openness and tolerance towards foreign cultures, discriminative behaviour among Koreans, Japanese, and Chinese will continue to exist. This work’s central findings on the importance of tolerance in East Asian societies may serve as a stepping stone for the adjustment of these societies towards a tolerance-improving migration policy framework.

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Abbreviations

3 T's	Technology, Talent and Tolerance
ASEAN	Association of Southeast Asian Nations
CFR	Council on Foreign Relations
COE	Global Center of Excellence (Japan)
GCI	Global Creative Index
GDP	Gross Domestic Product
GDP p.c.	Gross Domestic Product per capita
HRST	Human Resources in Science and Technology
ILO	International Labour Organization
JASSO	Japanese Student Services Organisation
JSPS	Japan Society for the Promotion of Sciences
KISTEP	Korea Institute of Science and Technology Evaluation and Planning (Korea)
KOFST	Korean Federation of Science and Technology Societies
MEXT	Ministry of Education, Culture, Sports, Science and Technology (Japan)
MoST	Ministry of Science and Technology (Korea)
MOST	Ministry of Science and Technology (China)
NSF	United States National Science Foundation
OECD	Organization for Economic Co-Operation and Development
PRC	People's Republic of China
ROK	Republic of Korea
R&D	Research and Development
SOE	State Owned Enterprises
S&T	Science and Technology
UN	United Nations

UNESCO	United Nations Educational, Scientific and Cultural Organization
US	United States
USA	United States of America
USPTO	United States Patent and Trademark Office

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Appendix

Appendix 1

Kurzzusammenfassung

Diese Arbeit ging der Frage nach, ob das Toleranz-Niveau in der japanischen, südkoreanischen und chinesischen Gesellschaft einen Einfluss auf deren Fähigkeit hat, hochqualifizierte Arbeitskräfte des Technologie- und Wissenschaftssektors, anzuziehen (HRST). Ziel der Arbeit war es, die aufgestellte Hypothese zu überprüfen, ob ein geringes Toleranz-Niveau in den ostasiatischen Gesellschaften für deren relativ geringen Bestand an ausländischen HRST verantwortlich ist. Hierzu wurde das Suchverhalten von Google Anwendern, die sich physisch in Ostasien aufhalten, analysiert. Aufgrund der Tatsache, dass Google vorwiegend von Nicht-Asiaten genützt wird, können mit Hilfe der Daten über veränderte Trends im Google-Suchverhalten für den Begriff “Diskriminierung” Erkenntnisse bezüglich der Wahrnehmung von Toleranz in den ostasiatischen Gesellschaften aus der Sicht von den Ausländern gewonnen werden. Zur Durchführung der Untersuchung werden offizielle Veröffentlichungen der jeweiligen Staaten und Sekundärquellen verwendet.

Die Ergebnisse der Analyse zeigen, dass die Hypothese eines Zusammenhangs zwischen einem geringen Toleranz-Niveau in allen drei ostasiatischen Staaten und einer schwach ausgeprägten Rekrutierungsfähigkeit bezüglich ausländischer HRST bestätigt werden konnte. Neben dem Hauptbefund einer bewiesenen Existenz von Diskriminierung in allen drei ostasiatischen Staaten, welche die Lebensbedingungen für derzeitige und potentielle HRST verschlechtert, tragen derzeit noch inadäquate Arbeitsbedingungen, wie beispielsweise eine generell schwache Wissenschaftsbasis, wesentlich dazu bei, dass sowohl der Bestand als auch der Zuzug von ausländischen HRST nach Ostasien gering ausfällt.

Appendix 2

Abstract

This thesis deals with the question whether the level of tolerance in Japanese, South Korean, and Chinese society influences these countries ability to attract qualified human resources in the fields of science and technology (HRST). It aims at verifying whether a hypothesized low tolerance level in East Asian societies is responsible for the relatively low share of foreign HRST living and working in these countries. In order to prove this hypothesis, the author analyzes the search behavior of Google users residing in East Asia. Given the fact that Google is predominantly used by non-Asians, data on changing trends in Google search behavior for the term “discrimination” makes insights into foreigner’s perception of tolerance in East Asian societies possible. This thesis bases its analysis of tolerance in these societies on legislation from the three states mentioned above as well as the Google data and secondary sources.

As the findings of the thesis show, the hypothesis of a low ability of all three East Asian states in attracting foreign HRST due to a low tolerance level can be substantially confirmed. Besides the main findings of a proven existence of discrimination issues in all three states, which lower the living conditions for current and potential foreign HRST, inadequate working conditions, as reflected in a relatively weak scientific base, are responsible for both, the low stock and low inflows of foreign HRST working and living in East Asia.

Appendix 3**Lebenslauf**Angaben zur Person:

Name	Mag. (FH) Stephan Si-Hwan Park
Adresse	Wurlitzergasse 74/1/4, 1160 Wien
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Geburtsdatum/Ort	30. März 1984 in Wien, Österreich
Staatsangehörigkeit	Österreichisch

Ausbildung:

2008 bis vorr. 2010	Studium des Studienganges „ <i>Wirtschaft und Gesellschaft Ostasiens</i> “ an der Universität Wien; Erhalt des Leistungsstipendiums von der Universität Wien für das Studienjahr 2008/2009; Studienabschluss <i>Master of Arts (MA)</i> – Studiendauer voraussichtlich 4 Semester
05-2007	Weiterbildung in Präsentationstechnik und Lehrinteraktion am Forum Momentum
10-2003	Weiterbildung in Präsentationstechnik und Lehrinteraktion am Forum Momentum
2003 bis 2007	Studium des Studienganges „ <i>Sport-, Kultur- und Veranstaltungsmanagement</i> “ an der Fachhochschule Kufstein, Tirol, Studienabschluss <i>Mag. (FH) für Wirtschaftswissenschaften</i> im Oktober 2007; Studiendauer 8 Semester – Abschluss mit Auszeichnung
1994 bis 2002	Besuch des Schottengymnasiums in Wien, Österreich; Erwerb der Hochschulreife
1990 bis 1994	Besuch der Volksschule Gilgegasse in Wien, Österreich

Auslandsaufenthalte:

2009	Koreanisch-Sprachkurs am Korea Language Institute der Yonsei University in Seoul, Korea
2006-2007	Tätigkeit als Event-Projektmanager bei Pascher+Heinz GmbH in München, Deutschland; Tätigkeitsbereich: Erstellung von Präsentationen, Kundenbetreuung, Website- und Videoproduktion

- 2006 Tätigkeit als New Media Marketing -Manager bei Day Spa Association in Union City, USA; Tätigkeitsbereich: Website Produktion, Direct Mailing, Eventmanagement, Kundenbetreuung
- diverse weitere Kurzaufenthalte zum Spracherwerb in den USA, Grossbritannien, Spanien und Russland.

Arbeitserfahrung:

- seit 01/2009 Technischer Assistent für den Studiengang „*Wirtschaft und Gesellschaft Ostasiens*“ an der Universität Wien;
Tätigkeitsbereiche: Videoaufnahme von Lehrveranstaltungen, Begleitung von Konferenzen, Betreuung der Institutswebsite
- 2010 Tätigkeit als Englisch-Lehrer in der Privatschule der Saudiarabischen Botschaft in Wien
- 2006-2007 Tätigkeit als Event-Projektmanager bei Pascher+Heinz GmbH in München, Deutschland; Tätigkeitsbereiche: Erstellung von Präsentationen, Kundenbetreuung, Website- und Videoproduktion
- 2006 Tätigkeit als New Media Marketing Manager bei Day Spa Association in Union City, USA; Tätigkeitsbereich: Website Produktion, Eventmanagement, Kundenbetreuung
- 2002 bis 2003 Zivildienst beim Mobilen Hospiz der Caritas Wien;
Aufgabenbereiche: Fundraising, Website-Produktion, Betreuung in der Altenpflege

Kompetenzen:

- | | |
|------------------------|--|
| Sprachen | Deutsch (Muttersprache)
Englisch (fließend)
Koreanisch (gut) |
| Präsentation und Lehre | Technik
Didaktik
Rhetorik |
| Marketing | Eventmanagement
Konferenzmanagement
Internetmarketing |
| Soziale Kompetenzen | Durchhaltevermögen
Begeisterungsfähigkeit
Empathie |