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Two Edges of Asia in a Multipolar World: The Interconnections between Chinese and Turkish Higher Education Systems

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Abstract

The global higher education space is becoming increasingly multipolar. Though the existing inequalities among national higher education systems persist, increased international connectivity and collaborations create new opportunities. This study examines the interconnections between the higher education systems of two countries located at the opposite edges of Asia: Turkey and China. It adopts an exploratory comparative perspective that is intended to inform a larger research design. The findings show that the two systems have risen rapidly in the last decade, though with distinct size and speed of growth. There is growing collaboration between the Chinese and Turkish higher education systems in terms of the rate of scientific paper co-authorships and student mobility. The study reveals that Chinese and Turkish higher education systems are breaking their dependence on the traditional 'Core' or 'Global North' countries and are overcoming the global language barriers. Nevertheless, while the two systems have developed and built further connectivity, this development is still at an early stage, and more needs to be done. More effort in increasing the interconnectivity between the two national higher education systems will not only benefit the two countries but will also contribute to the multipolar higher education arena at the global stage.

Keywords: Higher education, comparative education, Turkey, China

Introduction

The world is becoming increasingly multipolar. The actors in the global system are diversifying as the worldwide relationships are increasingly more intensive, extensive and quicker (McGrew & Held, 2007). Distances that were traditionally perceived as "far" are shortened due partly to novel transportation and information technology (Castells, 2010). Even during the current COVID-19 pandemic, limitations on physical mobility does not prevent people from staying connected with the world.

Higher education connectivity is no exception to this. Indeed, higher education is globally connected. National higher education systems work on a system of global networks (Marginson, 2020). The global networks in which higher education systems operate are increasingly more democratised (Wagner et al., 2015), aligning with the global trend of multipolarity. However, the existing connecting nodes in the global network still continue to concentrate around certain higher education systems (Marginson, 2018, 2020). This unequal networked space is observed in various lenses in the literature, such as the global North/West and Global South/East binary, the gatekeeping role of language barrier, and world-systems approach which divide the world into core, periphery, and semi-periphery countries.

However, as the paper will show, this unequally networked global space is not rigidly defined, and it is open for new agentic actions from rising national systems who create novel connectivity among themselves. As the global collaboration is growing and becoming denser, these newly established

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connectivity does not necessarily continue to cluster around already existing cliques (Wagner et al., 2015). This indicates that the unequal system in global connectivity does not have to perpetuate.

In this paper, we investigate the interconnectivity between two emerging higher education systems, Chinese and Turkish higher education systems. These two systems were not traditionally seen as 'core' countries (Wallerstein, 1976), but they have significantly improved their positions in the increasingly multipolarised global higher education system, especially Chinese higher education. The aim behind is to demonstrate the exponential increase in the connectivity between the two emerging systems, which challenges the existing dichotomies of inclusion/exclusion. Specifically, we look at scientific co-authorships, data about student mobility and the existing collaboration programmes between the two systems.

Turkey and China are located at the two opposite edges of Asia, one being at the western-most part of it (Asia minor) and the other at the Eastern-most part. The two higher education systems are rapidly emerging in the global arena, though their size and speed of development are different from each other, as will be explained with data later. We provide further justification on our choice of the two national higher education systems below in the following section. This paper is an outcome of a first-stage explorative analysis of a larger research design, which will include a more in-depth and comprehensive exploration of collaboration between countries in Asia and beyond.

Higher Education Connectivity in a Multipolar World

Global and national higher education systems

National and global are two essential dimensions in higher education. As Marginson and Xu (2021) argue, there is a dual system of higher education in each country – that are national and global systems. On the one hand, higher education is primarily organised, operated and funded in national systems. National systems denote a country-wide system of rules, regulations and funding shaping higher education within the boundaries of nation-states. There are also social, political and educational cultures that play a role in shaping national systems (Marginson & Yang, 2021).

On the other hand, higher education is globally connected. The global system of higher education is about connections and resources in a world-scale ontology. For example, in the era marked by globalisation, there are frequent international research collaborations, mobility of scholars and students, and collaboration in educational programmes in higher education (Yang, 2003; Lee & Stensaker, 2021). Further, the national and global systems are often interconnected with each other. Those national higher education systems that are central in the global system tend to be strong as national systems (Marginson, 2018). In addition, higher education and science production are more likely to be regulated at the national level as the territorial nation-states have a higher capacity to do so, while the global system has distinct dynamics and works differently (see below).

The Global North/West and Global South/East binary

We identified a few perspectives in the extant literature that look at global relationships among higher education systems. One popular perspective focuses on the Global North and South binary (Santos, 2016), which is used in the higher education literature prevalently (e.g. Almeida et al., 2019; Gunter & Raghuram, 2018; Le Ha, 2018). Also, there are articles that discuss this binary system of inclusion/exclusion as West *versus* non-West (e.g. Xu, 2020). In this understanding, the global north/west higher education systems are more developed overall and hold an 'upper hand' in the global relationships with higher education systems in the global south/east. The research and funding concentrate in the global north in this unequal binary system, in which those in the global south strive to participate in and get included in the global north/west research ecosystem (Marginson & Xu, 2021; Xu, 2020). The global north/west continues to attract talents throughout the world while the global south/east higher education systems are on the sending side (Gunter & Raghuram, 2018). Also, the role of incentivising publications with authors based in higher education systems of the global North/West has been highlighted in the literature (Marginson & Xin, 2021; Xu, 2020).

Language in global publishing

Language is an important gatekeeper in the discussions of interconnections between higher education systems, especially concerning research interconnections. The two main bibliometric collections – Web of Science of Clarivate and Scopus of Elsevier – include mostly English language papers. According to Marginson and Xu (2021), more than 80% of all indexed journals in Scopus and 89% in the Science Citation Index Expanded (SCIE) are all in English. For Social Sciences Citation Index (SSCI), 90 per cent of all papers are in English. However, these percentages do not reflect the actual number of publications worldwide. Ulrich's Global Serials Directory, which is another authoritative source of bibliographic and publisher information, provides more than nine thousand scholarly journals published in Chinese, but only a fraction of these are included in the above-mentioned bibliometric collections (Marginson and Xu, 2021). This situation puts non-English medium higher education systems and researchers within them under strain. If they want to be 'included' in the global higher education system, they feel the need to publish in English. However, not having English as the first language puts limitations on the authors based on non-English medium higher education systems. Their connection to the English-speaking global system often relies on their English-as-a-second-language competence or the additional money they can spend on translators.

The relatively strong roles of French, Spanish, German and Arabic in their own respective spheres of influence is highlighted in the literature, but their prominence is in decline, and the English language maintains its position as the language of global academic interactions (Marginson, 2010). Given the situation, non-English medium higher education systems and researchers based in them face a conundrum: to teach and publish in English in order to be better connected to the English-dominated global system, which will leave the teaching and publishing in the native language weak; or, to teach and publish in the native language and thus strengthening the higher system at the local and national level but stay relatively disconnected to the world.

The world-systems theory and higher education

World-systems theory is another perspective in the literature that provides a lens to understand the relationships among higher education systems at a global stage (Wallerstein, 1976, 2004). We argue that this theory is more nuanced than the Global North/South or West/East binaries. It introduces a three-level categorisation consisting of core, semi-periphery and periphery systems. Wallerstein (2004) argues that these are relational terms, as they do not have essential meanings separately. Wallerstein introduces the three-level categorisation to explain the modern world-system as a capitalist world-economy, not higher education. Below is an excerpt from Wallerstein's book (2004) that explains the terms core-periphery using economist terminology:

> "What we mean by core-periphery is the degree of profitability of the production processes. Since profitability is directly related to the degree of monopolisation, what we essentially mean by core-like production processes is those that are controlled by quasi-monopolies. Peripheral processes are then those that are truly competitive. When exchange occurs, competitive products are in a weak position and quasi-monopolised products are in a strong position. As a result, there is a constant flow of surplus-value from the producers of peripheral products to the producers of core-like products. This has been called unequal exchange." (Wallerstein, 2004; p. 28)

Building on this definition, 'core' countries in the global higher education system largely overlap with what is prevalently discussed as the global north in the literature: they are at the centre of the unequal interconnections among higher education systems and benefit from the flow of talented researchers and publication co-authorship offers. By contrast, those in the periphery are comparable to global south countries, which are on the disadvantaged side of the world system. Semi-periphery countries, on the other hand, are seen as in between the core and periphery countries. In Wallerstein's (2004) words,

> "The semiperipheral states which have a relatively even mix of production processes find themselves in the most difficult situation. Under pressure from core states and putting pressure on peripheral states, their major concern is to keep themselves from slipping into the periphery and to do what they can to advance themselves toward the core." (Wallerstein, 2004; p.29)

Building on Wallerstein's ideas, semi-periphery countries may function as a core country towards those in the periphery but as a periphery to those in the core. Hence, these countries, too, suffer the flow of

ideas and academics to the core world countries and strive to be 'included' in the club of the advantaged. Wallerstein (1976), in an earlier publication, categorised Turkey and China as semi-periphery countries. However, the work was published more than 40 years ago now, and the world is increasingly becoming multipolar.

World-systems theory has been employed and developed in the literature by studies that look at cross-borders connections in higher education. For example, Olechnika and colleagues (2019) discuss the geography of international collaborations and highlight the inequalities regarding who dominates the research agenda and cross-border mobilities. The inequality among higher education systems is partly reflected in the physical mobilities of students and staff. The UNESCO Institute of Statistics data (2021) shows that Anglophone countries receive the largest number of internationally mobile students worldwide. Cantwell (2021) also draws attention to the mobility of post-doctoral researchers and graduate students worldwide and demonstrates a pattern that supports world-systems theory, but he also argues that this pattern is in decline.

Despite being widely used in the literature focusing on higher education and research systems (e.g. Schott, 1998; Kondakci, 2011, Olechnika et al., 2019), the world-systems approach has been criticised in the recently emerging literature. One major criticism argues that the world systems theory sees global relationships in a rigid way. It does not leave much space for accommodating the agency of individuals and institutions in the periphery or semi-periphery systems to move up (Marginson & Xu, 2021; Rojas, 2013). By agency, we mean freedom to achieve whatever the persons and institutions within a higher education system decide to achieve as responsible agents, building on Sen's definition (1985). According to Wallerstein, substantial changes in the world system is unlikely, and this will not happen unless global capitalism is eliminated (Rojas, 2013). Such a perspective provides a deterministic view of the world, which only perpetuates the existing inequalities in the global higher education system (Marginson & Xu, 2021). Similar critique would also be valid towards the existing inclusion/exclusion binaries such as Global West/East, North/South higher education systems. Though these binaries still strongly hold sway in today's world, there is room for agency in the multipolar global stage, which can be observed in the available empirical data.

Countries that were small producers of scientific publications ten to twenty years ago have now accelerated their scientific production (NSB, 2020). The globally networked higher education space facilitated by developing technology—such as video conferencing tools Zoom and Teams or online collaboratory word processors such as Google Docs and Microsoft Word—make interconnections and collaborations increasingly easier (cf. Castells, 2000). This situation is not just valid for countries in the core but countries outside of the centre. There is an increasing trend in international collaborations—more than one out of five papers have co-authors from multiple countries (NSB, 2019). In addition, the rapidly developing technology is helping with language barriers. For example, the development of artificial intelligence and instant machine translation between various languages facilitated communication among 'non-centre' countries. The two countries considered in this study are examples of traditionally non-centre countries. They have non-English medium higher education systems and do not share the same main language, but they have significantly expanded their collaboration and interaction, as will be shown below.

Turkey and China in the global higher education system

Global collaboration is growing and becoming denser. However, the relationships are not clustered around the already existing cliques, meaning that the inclusive/exclusive power relations discussed above are not necessarily reproduced in the global interconnections (Wagner et al., 2015). The selected two countries, Turkey and China, which are not traditionally conceived as core countries (Wallerstein, 1976), are good examples of exercising their agency in developing national higher education systems. To illustrate, in a study that looks at scientific collaborations among 36 OECD countries using a centre-periphery perspective, Choi (2012; p. 25) finds that Turkey, along with Korea, were 'rising stars'. Among all of the OECD countries, Turkey had the largest increase (133.3 per cent) in the share of degree centrality from 1995 to 2010 (Choi, 2012). Share of degree centrality is related to building own clusters in the global network and moving towards the centre. Choi (2012) also reveals that Turkey had the least

number of patents in 1995 among OECD countries but ranked 18th in 2010 with a 55-fold increase. Choi (2012) concludes that Turkey, along with Korea, was increasingly becoming a preferred nation to collaborate with internationally in the above-mentioned 15-year time frame.

The data on international student mobility also indicates an increasing attractiveness of the Turkish higher education system (Turkish Higher Education Council, 2020). Traditionally being a sending country, Turkey has transitioned into a receiving country after the 2010s as the number of inbound internationally mobile students surpasses outbound internationally mobile students (Oldac et al., 2018). Turkish higher education develops towards becoming a regional hub (Kondakci, 2011; Kondakci et al., 2017). In their social network analysis, Kondakci and colleagues (2017) show that Turkey has become a regional higher education hub in Western and Central Asia'. Turkey receives by far the highest number of students from two Central Asian and Turkic countries: Azerbaijan and Turkmenistan (UNESCO UIS 2021; Kondakci et al. 2017).

China has seen astonishing growth in both the size and quality of its higher education system in the last two decades. There is a significant growth in its scientific output. This growth is at such a level that Marginson and Xu (2021) argue that China puzzles researchers subscribing to centre-periphery and global North-South approaches. The speed China's research output has grown in the last ten years has been almost twice the annual average of the world (NSB, 2019). China has become the largest system with the output of English papers, which is not their first language, bypassing the US in 2016 (Marginson & Xu, 2021). China's rise in the global higher education environment has been so prominent that it has been deemed to move from 'just a follower' (Wende & Zhu, 2016, p. 119) towards becoming a potential leader in higher education at a global stage (Wende & Zhu, 2016). China is currently leading the world in highly cited papers in mathematics and moving close to the top portion in computer science (Marginson & Xu, 2021). China's Tsinghua University is leading the world in high citation papers in the STEM areas, ahead of MIT (Marginson & Xu, 2021).

China is traditionally viewed as a major sending country of international students and faced the severe problem of brain drain in the 1990s (Wang & Bao, 2015). Reversing the brain drain and attracting international students have been high on the Chinese government's agenda since the late 20th century (Marini & Yang, 2021). Various efforts, including establishing a generous scholarship for international students, along with the rapid development of the Chinese higher education system, turn to be effective in attracting international students. According to the Ministry of Education of China (2019), in 2018, China hosted 492,185 international students while sending 662,100 Chinese students abroad. The Project Atlas (2020) data shows that in 2019, China has become the third most popular destination country for international students, just behind the USA and the UK. In 2018, among all international students in China, 59.95 per cent were from Asian countries and 16.57 per cent from African countries (Ministry of Education of China, 2019). It is evident that China is becoming an important hub for international students.

An Exploratory Comparison Approach

As the review of existing literature above demonstrated, the world is increasingly becoming multipolar in its higher education space. The existing frameworks, such as the ones discussed above, fall short in explaining some of the rising higher education systems around the world. The two national higher education systems explained in this paper, China and Turkey, are good examples of systems that demonstrate agency in non-centre positions.

As such, this study provides an exploratory comparative analysis of Chinese and Turkish higher education systems and the interconnections between them using existing internationally available datasets, such as the ones provided by the UNESCO Institute of Statistics (2021) or National Science Board indicators (2020). This is an early-stage exploratory analysis of a larger research design that will follow, which will include a more in-depth and comprehensive exploration of collaboration between countries in Asia and beyond. In the next section, we provide a snapshot of the two national higher education systems using the available data to highlight their differences and similarities. Afterwards, we

discuss the interconnectivity between the two systems using bibliometric and mobility data. A discussion follows this, and a conclusion section rounds off the paper.

Comparison of the Two Higher Education Systems

In recent years, Chinese and Turkish higher education systems are both marked with their significant quantitative growth—e.g. in research output, the number of higher education institutions (Cin et al., 2021; Emil, 2017; Marginson, 2021; Mok & Jiang, 2017; National Science Board, 2019). However, the two systems have considerable differences. As Table 1 demonstrates, there is a significant quantitative size difference between the two national higher education systems. While there are 207 tertiary education institutions in Turkey, this number is 2,663 in China. Considering that the two countries have different population sizes—China having a population of 1.398 billion and Turkey having a population of 83 million (World Bank, 2021)—the higher number of tertiary institutions in China is understandable. However, while the Chinese population is approximately 17 times larger than the Turkish population, the number of tertiary education institutions is close to 13 times higher in China. These numbers indicate a higher proportion of tertiary institutions per person in Turkey.

Table 1. Comparing two national tertiary education systems

	China	Turkey
Total number of tertiary education institutions	2663[1]	207
Total number of current students enrolled in tertiary education	44,935,169[2]	7,560,371[2]
Two years associate degree, (Turkey) /short-cycle courses (China)	21,716,222	3,002,964
Undergraduate (ISCED 6)	23,124,011[3]	4,112,575[3]
Master's (ISCED 7)	2,339,554[4]	583,939[4]
Doctoral (ISCED 8)	380,444[5]	95,100[5]
Open and distant education	8,578,345	4,116,698
GERD (PPP $millions)	495,980.9	21,729.5
GERD-to-GDP ratio (%)	2.15%	0.96%

Sources: Authors' own tabulation drawing from multiple sources including, Turkish Higher Education Council Statistics (2020), The People's Republic of China Ministry of Education Reports (2019 data), UNESCO Institute of Statistics (2021) data, National Science Board (2020b) and (Gür & Yurdakul, 2020)

Notes: The statistics on China include data from mainland China only.

[1]This data was obtained from the official webpage of the People's Republic of China Ministry of Education Reports (2018)

[2] Both the Turkish Higher Education Council and China's Ministry of Education provide different numbers and more recent statistics, which are 9,940,133 for Turkey for the 2019/2020 academic year and 48,442,922 for China for 2019. The data from the Chinese authority includes enrolled postgraduates, undergraduates in regular higher education institutions, undergraduates in adult higher education institutions and web-based undergraduates. However, for comparability reasons, UNESCO data from 2018 are used for both countries.

[3] The data for this for both countries are obtained from UNESCO Institute of Statistics 2018 data for comparability reasons. The Turkish Higher Education Council provides a different number for a more recent 2019-2020 academic year, which is 4,538,926. China's Ministry of Education (2019) provides a different number which is 23,862,988 for 2019, and it includes web-based normal courses undergraduates

[4] The data for this for both countries are obtained from UNESCO Institute of Statistics 2018 data for comparability reasons. The Turkish Higher Education Council provides a different number for 2019-2020, which is 297,001. China's Ministry of Education (2019) provides a different and more recent number which is 2,439,530 for 2019.

[5] The data for this for both countries are obtained from UNESCO Institute of Statistics 2018 data for comparability reasons. The Turkish Higher Education Council provides a different number for 2019-2020, which is 101,242. China's Ministry of Education (2019) provides a different and more recent number which is 424,182 for 2019.

There are currently approximately seven and a half million higher education students in Turkey, while this number is close to forty-five million in the Chinese higher education system. As Table 1 above denotes, while China has more students in every tertiary education level than Turkey, Turkey has a higher graduate student to total student ratio. In Turkey, 8.98% of the total students are graduate students, while in China, this number is 6.05%. A similar situation is evident in doctoral-level research students: the doctoral to total student ratios are 1.26% and 0.84% for Turkey and China, respectively. For comparison, the doctoral to total student ratio tends to be higher in more established higher education systems, such as the UK with 4.51%, Germany with 6.41% and the US with 1.87%. Another interesting situation concerns distant programmes. More than half of the total tertiary education students are open and distant education students in Turkey, while in China, web-based undergraduates only account for

17.7 per cent of the overall student number in tertiary education (The People's Republic of China Ministry of Education Report, 2019).

Further, the data shared in Table 1 shows that China is currently investing in its research and development capabilities much more aggressively than Turkey. China allocates 2.15% of a much larger gross domestic product than Turkey's to its gross domestic expenditure on research and development. By contrast, Turkey is allocating 0.96% of its gross domestic product to its gross domestic expenditure on research and development. This implies that the Chinese higher education system may enjoy a better-funded higher education and research ecosystem than Turkey, although how the budget is distributed within the system is an important topic for discussion.

Interconnectivity between the two systems

Research output and co-authorships: There are a few ways of exploring the interconnectivity between two higher education systems. One way is to look at their research output and examine co-authorships. Both Turkish and Chinese higher education systems are up-and-coming ones. As Figures 1 and 2 below demonstrate, there is an increasing trend in the science and engineering research articles of each country in the last ten years leading up to 2018. The rising trend in publications is much stronger in China as the publications with at least one author based in China has more than doubled in ten years (118.32%). Turkey has also significantly increased its research output—the number of publications with at least one author based in Turkey has increased by 61.34% in the ten years leading up to 2018. It should be noted that China is a global outlier in increasing its research output as it grew with almost twice the speed of the world's annual average growth for the last ten years (National Science Board, 2020a).

On another note, the increasing trend in research outputs of the Turkish higher education system seems to have slowed down in the last couple of years. This slowing down in publication outputs in Turkey seems to go in parallel with a slight decrease in papers published through domestic collaborations only. Since this is a very recent development, more data that will become available in the coming years will be informative in understanding whether this is a short-term phenomenon or whether the Turkish higher education system has reached a plateau for a longer period. By contrast, both systems have steadily increased their papers published through international collaborations, as Figures 1 and 2 demonstrate below. The number of internationally collaborated papers increased exponentially in both countries, with Turkey growing its internationally collaborated papers by 139% and China 264% in ten years.

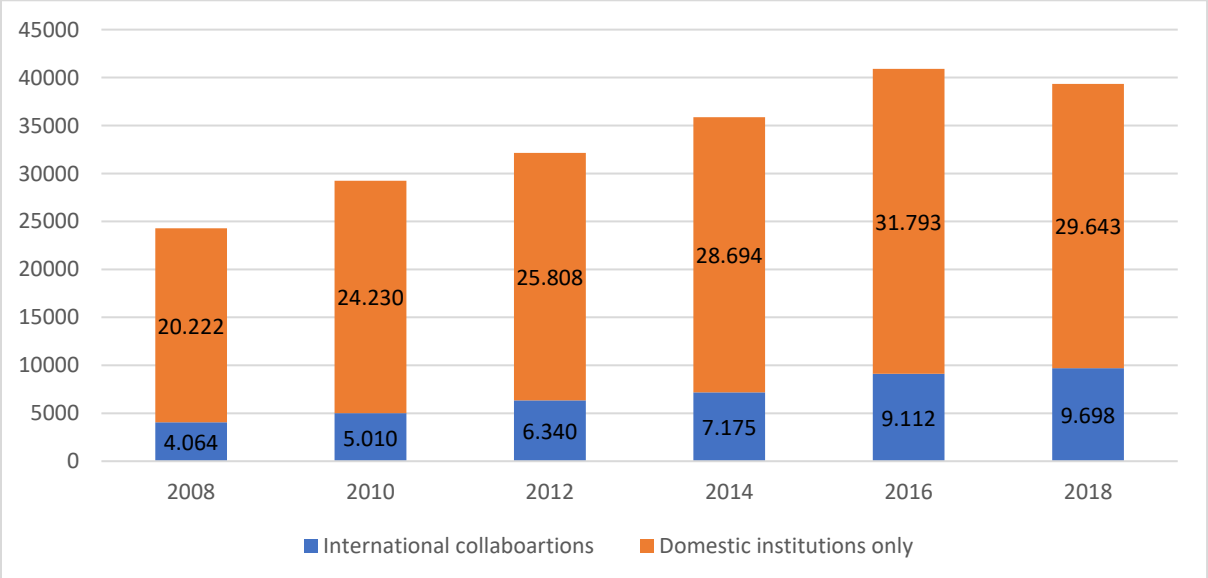

Figure 1. Science and engineering articles published by at least one author affiliated with a Turkish institution

Source: Authors, drawing on data from National Science Board (NSB) (2019), Table S5a-32. In science and engineering publications, science includes some social science.

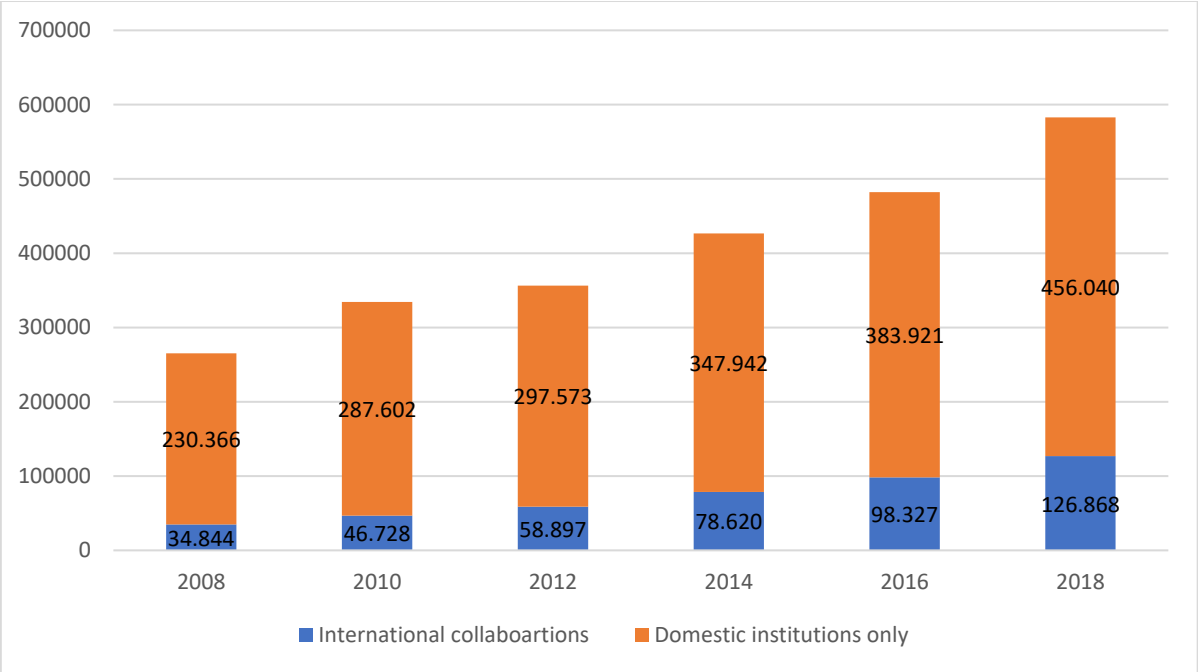

Figure 2. Science and engineering articles published by at least one author affiliated with a Chinese institution

Source: Authors, drawing on data from NSB (2019), Table S5a-32. In science and engineering publications, science includes some social science.

Figure 3 below shows the proportion of internationally co-authored papers to the total research output of Turkish and Chinese higher education systems using the National Science Board's indicators (2020). Comparing the data from 2008 with that of 2018, there is a clear upward trend in international collaborations for research publications in each higher education system. Overall, Turkey seems to be more internationally connected in terms of the proportion of internationally connected papers both in 2008 and in 2018; however, the sheer number of publications produced by at least one author based in a Chinese higher education institution dwarfs internationally co-authored papers by those produced by at least one author based in a Turkish institution.

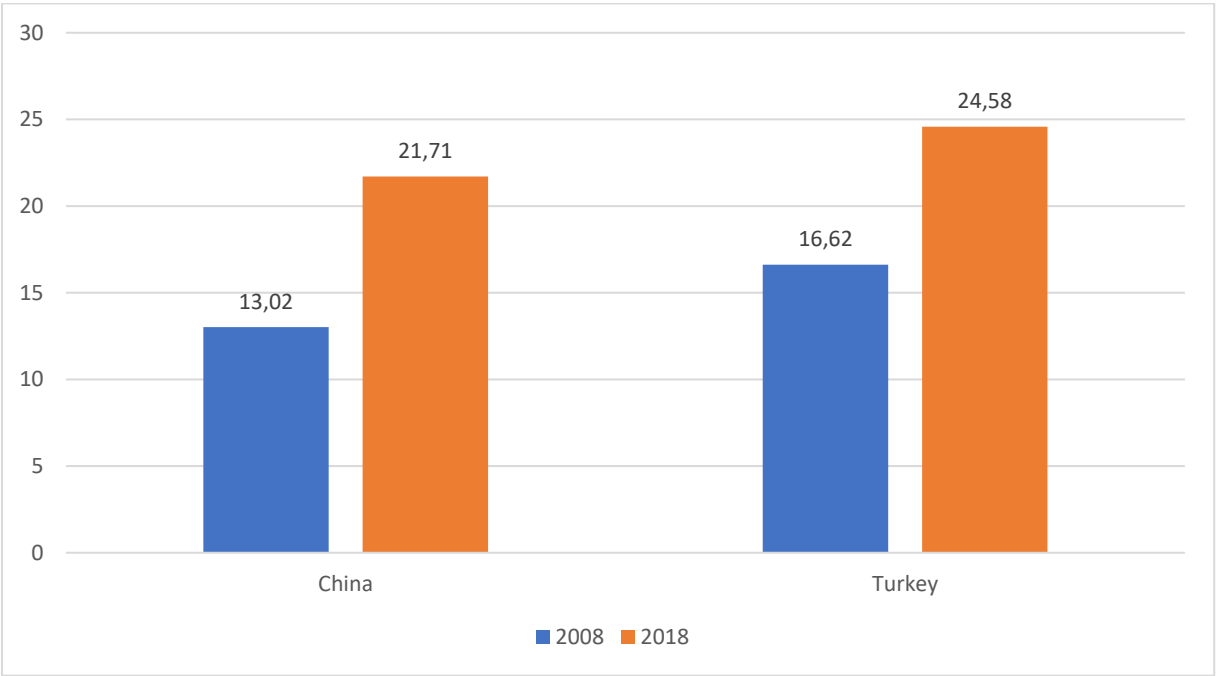

Figure 3. The proportion of internationally co-authored papers to the total number of papers (in %)

Source: Authors, drawing on data from NSB (2019), Table S5a-32.

The above data indicates that both Chinese and Turkish higher education systems are expanding in terms of their research output and that they are becoming more globally connected. However, the data does not clarify to what extent this increasing international collaboration is steered by Turkish-Chinese collaboration. Using the extensive dataset provided by the National Science Board (2020a), below in Table 2, we investigate co-authorship in science and engineering papers between Turkey and China. The table shows a stark hundredfold increase (from 9 to 906) in the number of papers co-authored by at least one author based in a Turkish institution and at least one author based in a Chinese institution between 1996 and 2018. This is an immense increase in research article collaborations between the two countries.

On another note, the data we have shred till now in this section have demonstrated that both systems have been expanding their research outputs in the last ten years. So, does this increased number of co-authored papers between China and Turkey actually mean that there is an increased collaboration effort between the two higher education systems or is this just a natural result of an increased number of publications overall? One way of examining this is to look at the international collaboration index provided by National Science Board (2020), provided in Table 2 below. National Science Board (2020) explains that this index is useful in the sense that it helps correct the size differences between higher education systems. It specifically examines whether bilateral collaborations in publications between the two systems are at an expected level considering overall global research collaborations. A value close to 1 means an expected level of collaboration, anything above this value indicates a stronger than expected level of collaboration, while anything below indicates a lower than expected collaboration. As the data in Table 2 below indicates, the international collaboration index between Turkish and Chinese higher education systems have increased significantly, from 0.20 in 1996 to 0.42 in 2018. However, the current coefficient still denotes a lower than expected collaboration between the two systems, indicating that there is significantly more room for increased cooperation in research. In addition, according to the Nature Index (2021), in 2020, for Turkey, China was the third-largest collaborator in STEM areas, just behind the US, whereas for China, Turkey was the 29th largest collaborator in these areas. This seems to suggest a misbalance of reliance between Turkey and China in research collaboration.

Table 2. International co-authorship between Turkey and China*

	1996	2018
Co-authored S&E publications with at least one Turkish and one Chinese institution affiliated author	9	906
International collaboration index	0.20	0.42

Source: Authors, drawing on data from NSB (2019), Table S5a-33 and Table S5a-34.

International student mobility: Examining international student mobility provides a different perspective regarding the interconnectivity between Chinese and Turkish higher education systems. Figure 4 below demonstrates the available data on student mobility between China and Turkey using UNESCO data (2020). There has been a clear increase in Chinese students studying in Turkey in the last five years leading up to 2018. By contrast, we do not have data on the number of Turkish internationally mobile students studying in China. The Chinese government only reports the number of international students from 15 countries sending the largest number of international students to China. What we know is that Turkey is not among these 15 countries. Nevertheless, given the trends discussed till now, it is arguably safe to estimate that China would attract more Turkish international students.

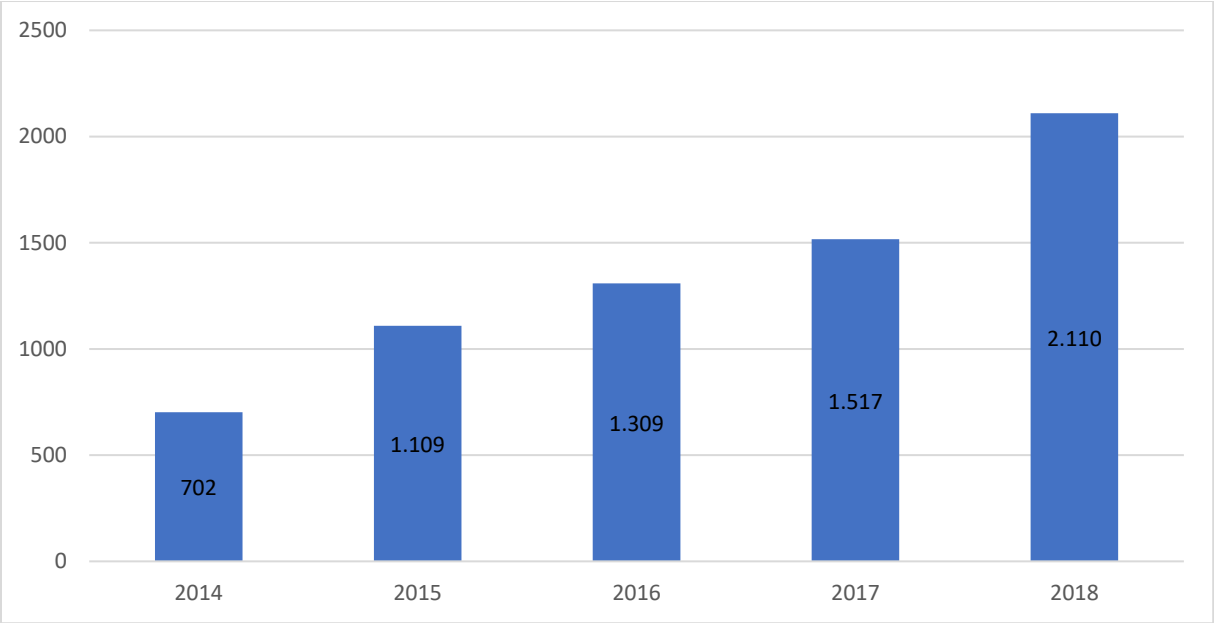

Figure 4. Number of Chinese internationally mobile students in Turkey
Source: Authors, drawing from UNESCO Institute of Statistics data (2021)

Non-academic developments increasing connectivity: Besides academic incentives for increased collaborations, there are other cultural and economic factors that may lead to increased interconnectivity between Chinese and Turkish higher education systems. A good example is the Belt and Road Initiative, which creates closers ties (Wende et al., 2020). While this initiative mainly aims at economic partnerships, it also works for increasing the research collaborations (Tijssen & Winnink, 2020) and overall higher education cooperation (e.g. Xie, 2020).

An example of a tangible fruit of the Belt and Road Initiative is the University Alliance of the New Silk Road (UANSR), led by Xi'an Jiao Tong University. This platform has been bringing universities together globally. Over 151 universities from 38 countries and regions have participated in this alliance, and it has two member universities from Turkey, which are Hacettepe University and Sabancı University (University Alliance of the Silk Road, n.d.). Supporting the discussion in this section, China's President Xi Jinping sent a letter in November 2018 to convey that strengthening cooperation between partnering countries' higher education systems is a critical part of building the overall Belt and Road Initiative (Zhang, 2018).

Discussion

This paper had an exploratory comparative look at the connectivity between Chinese and Turkish higher education systems. As the shared data indicates, the two higher education systems are becoming more closely interconnected with each other as they both emerge more manifestly in the global multipolar arena. This challenges the existing inclusion/exclusion criteria such as North/West and Global South/East binary, the gatekeeping role of language barrier, and world-systems approach which divide the world into core, periphery, and semi-periphery countries. As Marginson and Xu (2021) suggest, the world is moving towards becoming increasingly multipolar, and we need to re-imagine the higher education space accordingly.

The findings support Marginson and Xu's (2021) argument that there is room for the agency of national higher education systems in the multipolar world. The existing influential perspectives in the literature, such as world system's theory (Wallerstein, 1976; 2004) or Global North and South (Santos, 2016) discussed earlier in the paper, rightfully draw attention to the inequalities among higher education systems at the global stage. They have important explanatory power in highlighting the reproduction of the inequal inclusion/exclusion binaries on the global stage. However, they do not look into the existing unequal relationships between higher education systems. Especially in the case of Wallerstein's approach, the world-systems approach is conceived in a rigid manner and change in the system is seen

as unlikely (Rojas, 2013). By contrast, the two higher education systems examined in this study indicate that such a world system is by no means unbreakable through more agency of countries that are not traditionally conceived as centre countries. The growing cooperation between these countries has the potential to change the dynamic of the global higher education system.

The findings of the paper indicate that Chinese and Turkish higher education systems are breaking their dependence on the traditional Core or Global North countries and are overcoming the global language barriers. These two national higher education systems are building cross-border bridges between each other, strengthening the already existing bilateral connections. It is also found that the inclusion/exclusion theories popularly used in the literature are getting increasingly harder to explain countries such as the ones included in this study.

In this sense, the findings of the paper call for an ontology of a more plural approach in examining higher education system connectivity in the global space of higher education. This is congruent with the 'ecology of knowledges' understanding proposed by Santos in his influential paper (2007). A sustainable and more dynamic interaction between higher education systems across the world is highlighted with this perspective. It argues for a move towards a more plural culture of knowledge ecology from a monocultural one. This is not to argue that all such systems are equal, as the inequalities de facto exist. The key is to keep the structural mechanisms open. We call for the disposal of the structural mechanisms of inclusion/exclusion as the networked higher education systems increasingly attain new spaces to collaborate and grow.

Having said these, there is still significant space for improving the interconnectivity between the two higher education systems. The international research output collaboration index between the two countries, though have increased significantly in recent years, is still at a lower than expected volume, as explained earlier. More effort in increasing the interconnectivity between the two national higher education systems will not only benefit the two countries but will also contribute to the multipolar higher education arena at the global stage. Thus, the findings of this study call for policies that facilitate and incentivise building further international connectivity between the two higher education systems.

In addition, Choi (2012), in her social network analysis study, designated the Turkish higher education system as a "rising star" (p. 25), as we discussed earlier. She demonstrated that the Turkish higher education system had the strongest development among 36 OECD countries, and only Korea was able to come close to the rapid development of Turkey's increased share of degree centrality, which led to Turkey becoming a more popular country for international collaboration. However, Choi's analysis examined data between 1995-2010. The more recent data we share in this paper, though not in the same nature, can give some idea about whether this trend still continues. The scientific papers produced in the last decade indicate a sustained increasing trend till 2016, but then a slow-down started afterwards (especially in the domestically co-authored scientific papers) with the latest available data from 2018 (NSB, 2019). Since this is a recent development, it is hard to gauge if this is a long-term change in the trend or a short-term one. By contrast, the available data indicates that the growth of Chinese higher education on the global stage has not lost its steam.

Conclusion

The growth of interconnections between the Chinese and Turkish higher education systems, which are mostly conceived as being outside of the traditional core countries, indicates that the higher education space in the global arena is becoming increasingly multipolar. These two systems have rapidly risen in the last decade in terms of scientific outputs and mobility attraction measures. However, the existing inequalities on the global stage are still there. The traditional core countries, such as those in the Anglo-American and European line, still hold the top places in the same measures. Language still has an inclusion/exclusion effect, and more is yet to be done to decrease the inequalities between the global north/south binary.

Limitations

There are limitations of the study. The data presented in this study may draw an incomplete picture of all research-related outputs. We assume that the data shared on academic research outputs will provide an adequately representative role in the fields of science and engineering. As it is clearly stated earlier in the paper, the data we used to produce the figures and tables for this study does not sufficiently cover every field of academic research output. Also, China's international co-authorships are stronger in the Science, Technology, Engineering, Mathematics fields and weaker in social science and humanities (Tijssen & Winnink, 2020). This study mostly has used science and engineering data when discussing research outputs of the two national higher education systems. Although we estimate that the broad growing trend in research outputs and international co-authorships would still be the case for fields other than science and engineering, Turkey may not have this much STEM-heavy focus in its research production. This may put the Turkish higher education system at a slight disadvantage in an exploratory comparison with the Chinese higher education system. In addition, only two countries are included in the study. The unpacking of the multipolar global higher education system requires the consideration of more national higher education systems and multilateral collaboration at the global level. These limitations open the door for further investigations, especially studies that focus on humanities and social sciences research and examinations of more countries.

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