Dynamics of higher education research collaboration and regional integration in Northeast Asia: a study of the A3 Foresight Program

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Abstract

This study investigated scientific research collaborations among universities in Northeast Asia and sought to conceptualize how they might influence, and be influenced by, broader processes of regional integration in economic, political, and societal arenas. To investigate these dynamics, a program for regional collaboration initiated jointly by the governments of China, Japan, and South Korea was taken as a case study. Co-authored publication outputs, annual project reports, and interviews with program participants at Japanese universities were analyzed using selected theories from the field of International Relations. The interviews explored the ideas researchers had about the potential for the indirect effects of collaborations to spill over into other arenas, and the barriers faced which impeded regional cooperation. The findings suggest that while a number of barriers exist, the program has contributed to ongoing knowledge production and regional collaboration, societal integration, and the cultivation of a generation of regionally-networked young researchers.

Keywords Higher education regionalism · East Asia · Research collaboration · Regional integration · Epistemic communities

Introduction

For the past two centuries, the majority of the contributions to knowledge in science and technology (S&T) have come from the West, with the USA assuming the leadership role for much of the twentieth century. The supremacy of Western research may be in decline, however, in part because Asia is fast emerging as a powerhouse of knowledge production and S&T innovation. Projections that describe the tilting of the research world toward Asia indicate that the region may surpass the USA within the next 15 years (Cummings 2014). With

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substantial investment being provided to universities to improve both the quality and quantity of research-based knowledge outputs, higher education institutions (HEIs) in Northeast Asia¹ are playing an important role in this global shift.

In addition to the rise in knowledge production, the Asian region has also seen a dramatic increase in regional cross-border collaborative research. This paper will look at developments in regional collaboration from the perspective of Japan, and place emerging trends and the ideas of actors at Japanese HEIs into the broader context of Northeast Asian international relations. To do so, a “top-down” program for regional collaboration initiated by the governments of China, Japan, and Korea (CJK) is taken as a case study, and a range of data are analyzed with the aim of uncovering the dynamics between HE cross-border collaborative research and broader processes of regional integration and cooperation in Northeast Asia. To set the stage, the paper first introduces the global and regional higher education contexts in which the growth of cross-border research collaboration is taking place.

Evolutions in global higher education and the impacts on Northeast Asian systems

Higher education (HE) systems worldwide have undergone dramatic structural changes in recent decades. The emergence of the concepts of the “knowledge society” and “knowledge economy” in government and policy circles has raised awareness of the socio-economic value of universities as key contributors to research-based knowledge production and innovation (Kearny 2009). In addition to the transition of modern societies into knowledge economies, a number of scholars argue that the processes by which knowledge itself is produced at HEIs has also undergone significant change. They suggest that the traditional mode of knowledge production which was characterized by an emphasis on basic research, clear distinctions and hierarchies between disciplinary sciences, and the autonomy of scientists (“Mode 1”), has been supplanted by a new mode (“Mode 2”), whereby knowledge production is “socially distributed, application oriented, trans-disciplinary, and subject to multiple accountabilities” (Nowotny et al. 2002, p. 39). Under this new paradigm, the production of research has become shaped by commercialization, accountability, and the external steering of research priorities (ibid.). Research universities are increasingly seen as a component of the “triple helix,” a model comprised of government-industry-university networks designed to foster innovation and economic growth (Hawkins 2015; Nabeshima and Tanaka 2011).

A second set of developments is the spread of communicative globalization and the advent of the Internet, both of which have spurred major changes in the nature of higher education research (Peters et al. 2009). The impact of these developments has led to the formation of a “global dimension” in higher education, consisting of “world or part-world systems of knowledge and information flow, networks, and people movement between institutions and systems” (Marginson 2011, p. 12). The emergence of this dimension has fostered the rapid expansion of cross-border research collaboration, evidenced by a dramatic rise in both the total number of internationally co-authored publications, and the proportion of these papers to all published science (Marginson 2018).

The development of this “Mode 2” world system coupled with the adoption in recent decades of a neoliberal market-oriented view of higher education has created an environment of intense competition (and strategic cooperation) between universities. This competition is further exacerbated by the growing prevalence of world and regional rankings regarding

¹ For the purposes of this paper, “Northeast Asia” refers only to mainland China, Japan, and South Korea.

research, innovation, and international reputation (Marginson and van der Wende 2007). In this setting, governments and HEIs are striving to improve global competitiveness both at the national system and institutional levels and to develop “world-class” universities. While “Mode 2” forms of trans-disciplinary knowledge production may be the new reality, the metrics used by ranking organizations such as ARWU and QS remain focused primarily on discipline-specific research productivity and impact (Hazelkorn 2009). As such, disciplines that continue to be Mode 1-oriented are also impacted by the increase in competition for rankings and research funding. In addition to research output and quality, some ranking systems (such as QS) also focus on the degree to which a university has a “global outlook,” measured by the percentage of international faculty and students (QS n.d.). Many HEIs thus seek to improve their position in the rankings through strategies for internationalization.

These broader global trends have affected the structures of HE systems in East Asian countries. Recent decades have seen concerted efforts in the region to internationalize HEIs and build world-class universities and research hubs to foster innovation and better compete in the global higher education landscape. In China, the “211,” “985,” and “Double First-class University” programs have been implemented to raise the overall quality of selected universities to world-class status, with particular emphasis being placed on improving publication rates and fostering university-industry linkages in the STEM fields (Hawkins 2015). In Korea, the Brain Korea 21 (BK21) project aims to augment global competitiveness by establishing 10 world class universities and make Korea one of the world’s top 10 countries for research papers (Byun and Kim 2011). Another project launched in 2008 is the World Class University project, which focuses on attracting prominent scholars from abroad to establish academic programs in key-growth fields like IT and biotechnology, and to conduct collaborative research with Korean professors (ibid). A number of similar policies have been implemented in Japan, with mixed rates of success (Hawkins 2015). The latest iterations include the “World Premier International Research Center” (WPI), and “Center of Excellence in the 21st Century (COE21) initiatives” (Hawkins 2015; Yonezawa 2007), and the “Top Global University” project (MEXT n.d.).

With respect to the shifts taking place within the system of global research, in particular the “tilt toward Asia” and the increasing proportion of publications involving Northeast Asian countries, a notable change in the past two decades has been the rapid rise in the quantity of China’s research output. Figure 1 highlights this trend by showing the growth of Web of Science publications in Japan, China, and South Korea from 1996 to 2016.

Over the past two decades, Japanese research showed moderate growth but remained relatively stable, indicative of a developed system. The emerging systems of South Korea and China showed more dramatic growth, with China in particular rocketing past Japan to become the top producer of research-based knowledge in Northeast Asia. The substantial increase in the production of Chinese research has been attributed to the growth of the economy and investment in science, technology, and education (Yang 2004). China’s investment in R&D rose 18% a year from 2000 to 2012, and is on track to surpass the USA in the next decade (Marginson 2016, p. 10). Investment in R&D in South Korea is high as well; in 2015, the country invested 4.23% of its GDP in R&D, the highest such proportion in the world among countries with well-developed research systems (OECD 2017).

In addition to the rise in the outputs of scientific papers, Northeast Asia has also experienced an increase in innovation, as evidenced by the growth in the number of patents in the last two decades. Increased economic integration, driven in part by growing vertical specialization in the region, has led to a marked convergence in innovation and technology flows particularly

Fig. 1 Web of Science Publications for Japan, China, and South Korea, 1996–2016. Source: Web of Science InCites

in the field of electronics technology (Brahmbhatt and Hu 2009; Nabeshima and Tanaka 2011). Figure 2 highlights the emerging upward regional trend in innovation based on the growth in patent assignees from the US Patent and Trademark Office (USPTO).²

Coinciding with this rise in innovation, there has also been a notable increase in intra-region patent citations, pointing to the development of a regional dimension of knowledge flows in Northeast Asia (Brahmbhatt and Hu 2009). These findings align with other studies indicating the tendency for knowledge spillovers to be geographically localized (Jaffe et al. 1993). It has been suggested that geographical localization of knowledge flows in the age of globalized science is due to the *tacitness of knowledge*, which entails that “complex scientific and technical knowledge can only be fully communicated if accompanied by face-to-face interaction” (Brahmbhatt and Hu 2009, p. 196).

In addition to the trends of increasing global research collaboration, intra-regional innovation, and the tilt of the research world toward Asia, there has been a growth in inter-university linkages within Asia, pointing to a pattern of emerging HE regionalization. Aligning with broader patterns of region building in the economic sphere, the higher education sector has witnessed a dramatic rise in both informal regionalization and government-initiated forms of regional cooperation. Examples include the Association of East Asian Research Universities (AEARU), government-initiated programs for regional student exchanges like the CAMPUS Asia program, and collaborative research programs such as the A3 Foresight Program (discussed in more detail below). Not limited to Asia, HE regional cooperation has been on the rise worldwide in recent years. Paradoxically, increased global competition in HE has facilitated increases in cross-border cooperation at the region-level, as nations and universities form tactical alliances and consortia to enhance the global competitiveness of their national

² USPTO data was used as a relatively objective reference point to avoid the bias that may be present in data from patent offices in any one of the three countries, and also because the US continues to be a major export market for all three.

Fig. 2 Trends in innovation for Japan, Korea, and China: number of USPTO patent assignees (1996–2017). Source: USPTO PatentsView ([n.d.](#))

systems. While HE region-building is a worldwide phenomenon, Asia stands out with respect to its rapid rate of regionalization (Kuroda 2016a).

Regionalization of East Asian higher education and the range of regional networks and organizations that have emerged to support its development have been addressed in the literature (see for example Byun and Um 2014; Kuroda 2009, 2016b; Kuroda et al. 2010). Most of this work has been descriptive, outlining the development of policies in response to shifts in the global higher education landscape. Potentially useful theories and frameworks for understanding HE region-building in East Asia have been proposed by Kuroda (2016b) and Knight (2012, 2016), although to date, there is little research that has explored the applicability of these ideas empirically. In the field of International Relations (IR), a vast literature exists on regional integration and regionalism, but although scholars in this field have largely moved beyond the nation-state as the sole unit of analysis and now study the influences of non-state actors, they have generally neglected the national and global roles played by universities and their effects on international relations. In light of these gaps, a valuable direction for both HE and IR research is to explore the connections and reciprocal influences of cross-border higher education activities and broader forms of regional integration in political, economic, and societal arenas. Considering the ongoing historical and political tensions that exist between China, Japan, and South Korea, gaining an understanding of the potential for HE collaboration to foster cooperation, mutual understanding, and regional integration is a valuable scholarly endeavor that is especially relevant in the Northeast Asian context.

Research design and aims of the study

This study was designed to address the abovementioned gaps in the literature. The A3 Foresight Program, a program for regional research collaboration created jointly by the three governments, was selected for in-depth analysis. The collaborative outputs specific to this program are investigated through the interpretive analysis of documents and semi-structured

interviews with scientists who have been involved in various A3 projects. Theoretical and conceptual frameworks from the field of IR are applied to explore the dynamics between HE cross-border collaborative research and broader processes of regional integration and cooperation between China, Japan, and South Korea. The primary aim of the research was to develop a nuanced understanding of the ways in which cross-border research collaboration may influence—and be influenced by—processes of regional integration in other arenas, as well as identify any perceived barriers that may impede regional cooperation. Focusing on data and perspectives from Japan, the specific questions that guided the research are:

- (1) To date, what have been the outcomes of the A3 Foresight Program with regard to HE regional collaboration?
- (2) In what ways might these outcomes influence, and be influenced by, processes of regional integration in the economic, political, and societal arenas in Northeast Asia?
- (3) What have actors involved in A3 projects perceived as barriers to successful regional cooperation?

To address these questions, a case study approach was adopted which involved the collection and analysis of a range of quantitative and qualitative data related to the A3 Foresight Program. Data was collected on the total number of publications from researchers at Japanese universities involved in A3 projects from 2006 to 2016, as well as those co-authored with partner country researchers. These data were obtained by analyzing 98 annual project reports which were available in the public domain (in Japanese) on the JSPS A3 Foresight Program webpages (JSPS [n.d.](#)). Final year reports from the 14 projects deemed completed at the time of this writing were further analyzed to gain a more comprehensive and qualitative understanding of program outcomes. Finally, five semi-structured interviews were conducted with researchers in Japan who were involved in various A3 projects, three of whom were the principal investigators (PIs) for their respective projects. Participants' names and the projects they worked on were anonymized in this paper for purposes of confidentiality. Interviews were conducted in either English or Japanese, and all Japanese transcripts and documents were translated into English by the author and cross-checked for accuracy with native Japanese speakers. Thematic coding of documents and interview transcripts was used to uncover emerging themes related to the research questions. Themes, passages, and direct quotes were then interpreted using selected IR theories and concepts, described in the following sections.

Measuring cross-border research collaboration

A well-established measure of outputs of cross-border research collaboration is international scientific co-publication (Davidson Frame and Carpenter 1979; Luukkonen et al. 1993; Lewison and Cunningham 1991; cited in Georghiou 1998). A noteworthy limitation to this approach is that scientists may benefit from international cooperation but choose to publish separately. Cross-border collaboration in research can manifest in a number of ways besides co-authorship. These can include researcher exchange, workshops and conferences, cooperation on projects, the offering of access to or cost-sharing of scientific instruments or facilities, and various forms of participation in national programs between countries (Georghiou 1998). The motivations for cross-border collaboration can be categorized into direct and indirect benefits. Direct benefits relate to the research project directly, “allowing the research to be

performed or applied at a higher quality, with a broader scope, more quickly or more economically than would be the case without cooperation” (Georghiou 1998, p. 620). Indirect benefits arise as a result of the cooperation and can include enhancement of reputation (for both participants, institutions, and participating countries), and other potential political, economic, or social benefits (*ibid.*). At times, the collaboration can be driven by external political or economic goals. In the same way, international collaboration can be impeded if it does not align with domestic government priorities (*ibid.*).

Other indirect benefits such as those that may emerge in the political, economic, or social arenas are more difficult to measure empirically, but this should not dissuade scholars and policymakers from recognizing their importance. Project impacts may not become apparent immediately, and some may manifest years after project completion. Furthermore, it is important to consider how broader developments in the political, economic, and social spheres might in turn influence the processes and possibilities of cross-border research collaboration. To conceptualize these potential influences, it is useful to draw on theories and concepts from the field of IR. These are introduced briefly below and applied in the analysis of the participant interviews.

Conceptualizing indirect effects: regional integration theories and the concept of spillover

A useful means by which to conceptualize the potential regional impacts of research collaboration is to apply theories from the IR sub-field of regional integration studies. While much of IR scholarship has traditionally focused on the nation-state as the primary unit of analysis, scholars have increasingly recognized the relevance of non-state actors including civil society and international organizations in fostering processes of integration. One such theorist was Ernst B. Haas, who put forth a theory of regional integration known as neo-functionalism. Haas acknowledged the importance of states in integration processes, but posited that both supra- and sub-national non-state actors were capable of acting independently to reinforce, undermine, or circumvent national policies (Schmitter 2005). In addition, Haas argued that when states agree to assign some level of supranational responsibility to realize a limited task, there is the potential for a “spillover” of unintended effects into other interdependent activities (*ibid.*, p. 257). These unintended effects and the varied interests of actors at the sub-, national, and supranational levels entail that integration is an inherently non-linear and conflictual process. As such, states and other actors may move forward and backward along an axis of cooperation and be at different stages of integration in the economic, political, security, and societal arenas at any given time.

The above four arenas are the typical focus of regional integration studies. An interconnected but unique arena that has yet to be adequately explored is that of the higher education sector. With its own partly autonomous dynamics (Marginson 2017), HE has the potential to influence societies through both its institutionalized structures and its capacities for local, national, and global agency. From a neo-functionalist perspective, research collaborations among academics within a given region could spill over into forms of economic integration through the connections of HE research to industry. Examples of HE-to-industry spillover have been documented in other studies, which have shown that in certain contexts the presence of research universities has had positive effects on local industry including increased patent activity, increases in innovation (Jaffe 1989), and encouraging technology-based firms to locate near universities (Audretsch et al. 2004).

While connections can arguably be drawn between higher education and the economic arena, making a connection to the political dimension through the notion of spillover is more tenuous. There is, however, another theory from IR can be helpful in conceptualizing the way HE research collaboration can affect the political dimension. Some scholars posit that networks of knowledge-based experts (termed *epistemic communities*) are increasingly having a direct impact on policymaking, including decisions requiring international policy coordination (Adler and Haas 2008; Dunlop 2011; Haas 1992).

Epistemic communities

As knowledge of the natural world and the application of science and technology have exponentially grown, so too has recognition of the complexity and interconnectedness of problems of global concern. As a result of this increasing complexity in areas such as nuclear energy, the environment, technology, public health, and the interactions of globalized economies, policymakers are often unfamiliar with the technical aspects and potential ramifications of policy decisions across issue-areas. In the face of this growing uncertainty, decision makers have increasingly turned to experts in specific areas for advice. It is here that knowledge-based experts have the power to influence the political dimension. In addition to advising on specific policy concerns, some IR theorists have argued that these expert groups, or “epistemic communities,” provide “channels through which new ideas circulate from societies to governments as well as from country to country” (Haas 1992, p. 27).

A concept developed by IR scholar Peter M. Haas, an epistemic community is defined as “a network of professionals with recognized expertise and competence in a particular domain and an authoritative claim to policy-relevant knowledge within that domain or issue-area” (Haas 1992, p. 3). Furthermore, members will have shared sets of normative, principled, and causal beliefs, as well as a common “policy project,” which guides their professional practice and has the potential to influence policy and politics (ibid, p. 3). According to Haas,

Members of transnational epistemic communities can influence state interests either by directly identifying them for decision makers or by illuminating the salient dimensions of an issue from which the decision makers may then deduce their interests. The decision makers in one state may, in turn, influence the interests and behavior of other states, thereby increasing the likelihood of convergent state behavior and international policy coordination, informed by the causal beliefs and policy preferences of the epistemic community (ibid., p. 4).

To determine whether regional research collaboration has an effect on broader policies for regional integration, it is valuable to study whether and to what degree regional research teams working on particular issues satisfy the above criteria of epistemic communities. If these groups fit the description, it may be the case they have had or will have some level of influence on policy choices at the national and/or regional levels.

The IR theories and related concepts of neo-functional regional integration and epistemic communities presented above were applied to the case study analysis. The paper proceeds with a brief description of the A3 Foresight Program, followed by a discussion of the findings.

The A3 Foresight Program

Beginning in 2005, the A3 Foresight Program is a funding scheme run jointly between the Japan Society for the Promotion of Science (JSPS), the National Natural Science Foundation

of China (NSFC), and the National Research Foundation of Korea (NRF). The program aims “to create world-class research hubs within the Asian region, which by advancing world-class research will contribute to the solution of common regional problems, while fostering new generations of talented young researchers” (JSPS 2015). According to the Trilateral Cooperation Secretariat, the three agencies work as a consortium to support joint research, seminars, and exchanges among researchers in the three countries (TCS n.d.). Each year, targeted research areas are chosen to receive funding from the three agencies, based on consultations that take place at meetings for “Heads of Research Councils of Asian Countries” (A-HORCs) and corresponding to the annual theme of the Northeast Asian Symposium (JSPS 2018). Since 2005, a number of projects have been funded for 5-year intervals in a range of scientific fields. As of this writing, 14 projects are considered to be completed, and 10 projects are currently underway.

Findings and analysis

A3 Foresight Program outputs

A3 projects to date have led to a number of publications, including internationally co-authored papers. Figure 3 presents the total number of publications from researchers at Japanese universities involved in A3 projects and those co-authored with partner country researchers.

Between 2006 and 2016, researchers at Japanese universities published a total of 1406 papers related to their respective A3 projects. Of these, 319 papers were co-authored with partner country researchers, accounting for 22.6% of the total.³ The fact that only 22% of the research outputs from A3 projects on the Japan side were co-authored with partner country researchers raises questions as to why co-authorship was not more prevalent, and also highlights the inadequacy of using co-authored publications as the sole method for measuring international research collaboration.

Based on an analysis of 14 final-year project reports, it was clear that in addition to co-authored publications there were a number of other direct and indirect benefits that resulted from the A3 projects. The report templates were formatted so that researchers could document both published and unpublished academic achievements, the training and development of junior researchers, the construction of a cooperative research system among the three countries, contributions to society, and unexpected achievements. Another section for issues/challenges associated with the project and prospects for further research allowed for reflection on barriers that impeded the attainment of project objectives as well as opportunities for the future.

In addition to publications, major outputs of the A3 projects included a number of seminars and conferences which, in many cases, attracted prominent researchers from across the globe. In this respect, the governments’ goal of creating a regional “hub” for world-class research was reportedly achieved. Another common activity was mobility and exchange of researchers—including many post-doc, graduate, and undergraduate students—between the three countries. These exchanges included both short- and medium-term mobility and the recruitment of early-

³ Interestingly, the Web of Science InCites database listed far fewer publications that recorded the A3 Foresight Program as a funding source. Only 76 total articles, data papers, notes, reviews, and proceedings papers involving Japan were listed; with 36 of these co-authored with either China, Korea, or both.

Fig. 3 A3 Foresight publication outputs: total published papers for Japan and co-authored papers with partner country researchers. Source: JSPS A3 Foresight Annual Reports (JSPS [n.d.](#))

career academics to positions at partner universities. Projects often incorporated research teams of 20 to 40 people from each country, many of whom took part in annual seminars held in each of the three countries. Contributions to society were often framed in terms of outreach, with project participants delivering talks at “super science” high schools and hosting lectures open to the public at their respective universities.

The discipline-specific academic achievements of the projects were generally presented as the foremost accomplishment. However, a common theme found in the reports was an emphasis on the importance of cultivating the next generation of young researchers with both the discipline-specific knowledge and the communicative abilities to engage in international collaborative research. In some cases, this emphasis was framed in terms of competition with the “West,” namely, the USA and Europe. Few reports elaborated in detail on the challenges that were faced during the projects, although some highlighted issues that also became apparent in the participant interviews. Once again, the notion of competition emerged, this time framed not as a competition of East Asia versus the West but as competition between the three East Asian countries that were supposed to be cooperating. This sense of competition among the collaborating researchers was typically felt when the specialisms of the participating research teams were too similar, rather than complimentary. The question arises: why, even if there was an overlap in expertise, was co-authorship not considered to be a suitable solution? The answers were not apparent in the reports, but it is possible that desire for patent ownership, status competition among universities, and lingering national rivalries may be contributing factors. These and other potential factors were explored in the participant interviews, discussed below.

In the case of A3 Foresight, none of the interview participants indicated that there were any immediate spillovers of project outputs into the economic arena. However, some did point out the likelihood for their discoveries to eventually have applied regional (and global) impacts in areas such as transportation, communications technology, medicine, and public health. This was partly because the researchers that were interviewed were involved in basic, rather than applied, research. They did, however, note that this fact proved to be a barrier when applying for funding, as JSPS required evidence that the projects had an applied side and relevance for society. This connects to the overall goal of A3 Foresight, which is to promote research that

addresses issues of regional concern. However, it also suggests that the concentration of funding and support for applied research may be putting constraints on the abilities of scientists to conduct basic research. This was recognized by participants as an emergent trend for all sources of funding, not just A3, and is reflective of the commercialization and accountability characteristic of the era of Mode 2 knowledge production.

Regarding spillover into the political arena, none of the interviewed A3 participants reported opportunities to engage directly in policy advising at the national or regional level in connection with their A3 projects. While this may not be the case for other researchers who were not interviewed, there was no mention of policy advising or advocacy in any of the project reports. This appears to be a disconnect between the stated goal of the A3 Foresight Program to “contribute to the solution of common regional problems” and the reality of the projects. Arguably, groups of experts from the three countries working on research of regional concern would be in a prime position to advise on regional policy coordination in their areas of expertise.

It is possible that the lack of opportunities for engagement with government corresponds to the general decline in relations between the three countries during the program period to date. According to one interviewee, in the early years of A3 there was a “more peaceful co-relation between these three countries, so there was a certain mood to increase collaboration,” which contrasts with the “hard political situation right now.” This may be reference to the period when the Democratic Party of Japan and then Prime Minister Yukio Hatoyama gained power and advocated for the creation of an East Asia Community, an orientation which has now shifted with the return to power of the Liberal Democratic Party. The practical implications of the apparent deterioration in relations among the three countries was also mentioned in one of the annual reports, which described how traveling among the three countries (in particular from China to Japan) “is not as easy as before.” Clearly, developments in the political arena can have both positive and negative influences on collaborative research in HE.

However, both the interviewees and the project reports did point to a common “policy project” characteristic of epistemic communities with respect to the shared goal of cultivating the next generation of regionally-networked young researchers. While difficult to measure empirically, the training of a cohort of scientists who have been socialized into a regionally-collaborative community may have important policy implications in the future. This aligns with the stated goal of the three governments who initiated and, notably, despite tensions in other arenas, have continued to support the A3 Foresight Program. It may be the case that while the three governments frequently reach impasses in the diplomatic and political spheres, focusing efforts for integration in the arenas of knowledge production and socio-cultural exchange may meet with the least domestic resistance. This approach aligns with neo-functionalism, which highlights how processes of integration often begin with issue arenas that are considered the least controversial (Schmitter 2005). This emphasis of both governments and research teams on societal integration also aligns with another theory of regional integration known as communication theory (see Deutsch et al. 1957) which takes societal integration as the starting point for spillover and focuses on whether people in a given region share fundamental values and beliefs. Karl Deutsch’s communication theory holds that a shared value system among either elites or the general populace in countries within a given region can lead to a situation in which the use of force becomes improbable, thus leading to political rapprochement and the fostering of a security community (Deutsch et al. 1957, cited in Yamamoto 2013).

While developing positive CJK relations was a common theme across many of the projects, some principal investigators interviewed expressed trepidation in encouraging their students to discuss topics that strayed too far from their disciplinary remit. For example, one researcher who was in charge of an A3 project expressly forbade his students from discussing politics and other sensitive issues with counterparts from China and Korea, instructing them to instead focus on their “mutual love of science.” In this respect, the broader historical and political tensions between the three countries were perceived as a barrier to regional cooperation that were best not discussed. Nevertheless, there was evidence that forms of societal integration did in fact take place among A3 project participants, in particular among the young researchers. For example, one academic who was a doctoral student during the time of his A3 project, stated:

so usually in ordinary life, we - many Japanese, have no or little experience to communicate with non-Japanese people, so – and for China and Korea, we usually hear things just from the news. But after communicating, directly communicating with Korean and Chinese guys, my impression has totally changed. Yes, of course they have some attitudes about the country of China or Korea, but as individuals they are very nice guys and not so different from we Japanese. So, in a sense, yes it was very good. Yes, they are very good friends now.

This same researcher described that during the project he published only with his Japanese research team, but since then collaboration with his colleagues in China and Korea has continued and they have recently co-published a paper. Another student had this to say:

I think there is no boundary for science, so if you are a scientist there is nothing important about which country you are from... But I am from China and some people from the old generation, they don't think we have a good relationship with Japan or Korea. So they have that thought in their mind, and I want to influence them because I am studying in Japan, and I got the chance to talk with people from all over the world, so I want to change their ideas. So, during the A3 meeting, I talked with the professor from Korea and he also had similar thoughts so that makes me feel that I am not the only one that wants to make everyone be friendly...

Cross-border friendships, mutual understanding, and desire to influence the minds of others are indirect effects that extend beyond the project goals of scientific knowledge production. In this respect, while there was no evidence of *immediate* spillover of project outputs into the economic and political arenas, the above (and other) participants did indicate that forms of societal integration took place at some level as a result of the A3 projects. If communication theory holds, these processes of social integration, particularly among groups of regionally networked knowledge-based experts, may spillover into these other arenas in the future. Cross-border friendships and mutual understanding among scientists could connect to the idea of epistemic communities if these relationships fostered shared ideals and the formation of a policy project. While these experiences alone are not sufficient to inherently develop epistemic communities, they are arguably necessary initial conditions for their development. In this respect the full reach of the A3 Foresight Program into other areas of regional integration would be best measured with a longitudinal study that followed the activities of the young researchers throughout their careers and explored whether epistemic communities were indeed formed.

Conclusions

The demands of the Knowledge Economy and the evolution of “Mode 2” knowledge production, the increasingly networked system of globalized science, and the pressures to internationalize and enhance research outputs to maintain competitiveness in the global rankings game all contribute to a higher education setting that encourages productive cross-border research collaboration. In response to these developments, the amount of global scientific research collaboration has seen a significant increase in recent decades. As Asia rises as a global competitor in knowledge production and innovation, so too have there been increases in regional collaboration between Japan, China, and South Korea. While government and institution-level policymakers focus on the ways these collaborations can produce applicable knowledge, fuel innovation, and help institutions and systems achieve “world-class” status, what spillover mechanisms for social change might be getting overlooked?

This small-scale exploratory study suggests that the indirect effects of research collaborations across countries and cultures can have important societal impacts beyond those measured by the instrumental rationalist metrics of academic capitalism (Slaughter and Leslie 2001). As such, scholars and policymakers would benefit from considering an interdisciplinary research program that explores the ways research collaboration (and HE regionalization more broadly) can foster forms of regional integration in other arenas. Further research is also needed that investigates the ways developments in other issue areas can both augment and obstruct collaboration and knowledge production.

These reciprocal influences were evident in the investigation of the A3 Foresight Program. The analysis highlighted a number of instances of the direct and indirect benefits of collaboration and potential areas for spillover, and also pointed to a number of external factors that were perceived to impede regional cooperation. Benefits included ongoing (post-project) collaboration and knowledge production, increases in regional mobility and exchange, and forms of societal integration among the next generation of young scientists. However, the apparent lack of engagement with established epistemic communities by the three governments is arguably a missed opportunity. In addition to supporting regional collaboration for the purpose of enhancing global competitiveness, governments should recognize of the potential value of contributions from transnational epistemic communities to both S&T and broader forms of policy coordination.

It is valuable to point out that the A3 Foresight Program is but one among an expanding array of bilateral and multilateral arrangements, both formal and informal, between China, Japan and South Korea; Japan and Southeast Asia; China and Southeast Asia, and so on (Byun and Um 2014, p. 140). As such, it is not the case that the East Asian region is a prioritized region for developing a research community among the CJK countries. Each of these countries pursues research collaboration with North America and Europe, and also competes with one another for collaboration with ASEAN.

Given this state of affairs, governments and policymakers in the region would benefit from conceptualizing the potential effects of these growing collaborations from a number of perspectives. Looking beyond the dominant model of HE as a tool for the production of human capital, applicable knowledge and the enhancement of global competitiveness, policy choices should also be informed by a recognition of the global public good characteristics and regional impacts of collaborative research (Marginson 2017).

A consideration of the opportunities for positive spillovers, the value of inputs into policy decisions from epistemic communities, and the potential for socialization of shared norms and

values to lead to broader forms of societal integration are but some of the ways to conceptualize the influence research collaboration can have in fostering regional cooperation. Further research into these and other approaches is needed to gain a fuller picture of the societal value of HE, as well as critical reflection on the limitations and barriers that may impede potential impacts of cross-border research in other arenas. But in a time of growing tensions in the Northeast Asian region and the rise of populist movements advocating isolationism and de-globalization in the West, researching and highlighting the ways global science might contribute to peace, mutual understanding and regional cooperation is a valuable endeavor.

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