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Editorial:
From Internal to International Issues in Higher Education Systems

External developments have a dual impact on higher education organizations (HEIs). On the one hand, HEIs have to reconsider their structures and functions as part of their responses to the external pressures. On the other hand, HEIs are expected to respond to the needs of their societies in dealing with these developments. Research on higher education is essential part of the dual responses of HEIs to external pressures in a volatile environment. Five articles on different issues surrounding have the potential of contributing to the dual efforts of HEIs.

Oldac and Yang examined the interconnections between higher education systems of Turkey and China. Adopting exploratory comparative perspectives, the study documented common patterns of growth between Turkish and Chinese higher education systems. Collaboration in research and student mobility have also been increasing between two higher education systems. The growth patterns and widened collaboration in internationalization was interpreted as an emancipation of Turkish and Chinese higher education systems from "Global North." The second article of the issue by Moghadam-Saman investigated the role of disciplinary affiliation of doctoral students in their engagement in non-academic sectors. The results suggest that there are various patterns intersectoral collaboration among doctoral students. The study shows that country and university variables are significant factors, leading to the predominance of social-practice-based understanding of intersectoral research collaboration. The third article of the issue by Koyuncu and Demirhan investigated the quality of work life, organizational commitment, and organizational citizenship behaviour of teaching staff working in higher education organizations. An analysis of the data from 320 academic staff members suggested that both quality of work life and organizational citizenship behaviour of teaching staff were high while their organizational commitment was at moderate level. In addition, Koyuncu and Demirhan documented a strong positive correlation between the quality of work life and organizational commitment, a moderate positive correlation between the quality of work life and organizational citizenship behaviour, and a moderate positive correlation between organizational commitment and organizational citizenship behaviour. These results suggest that the quality of work life contribute to commitment of academic staff members to their organizations. In the fourth article, Cheung conducted a systematic review on internationalization of higher education in Southeast Asia, which is a unique spot in international student mobility. An analysis of 56 publications revealed country origin of the publications on internationalization in higher education, the methodologies of these publication and the thematic focuses of these publications. Learning experiences of international students and internationalization policies are two prominent thematic focuses of Cheung's thematic review. The final article of this issue by Yilik explored the perception of higher education students about micro-credentials and the motivation of the students behind taking up micro-credentials. According to the results, micro credentials are perceived as supplementary tools to traditional degrees rather than alternatives to these degrees. Hopefully the articles of this issue will prove beneficial to international scholars and policy makers in higher education around the world.

Yasar Kondakci
Editor

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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.

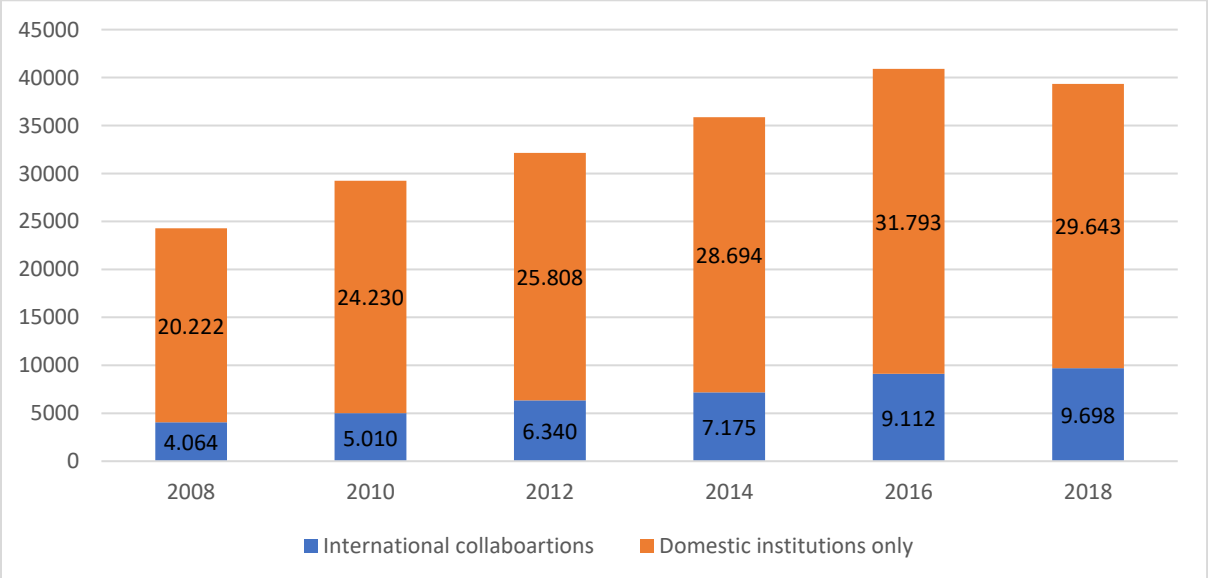

Figure 1. Science and engineering articles published by at least one author affiliated with a Turkish institution

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

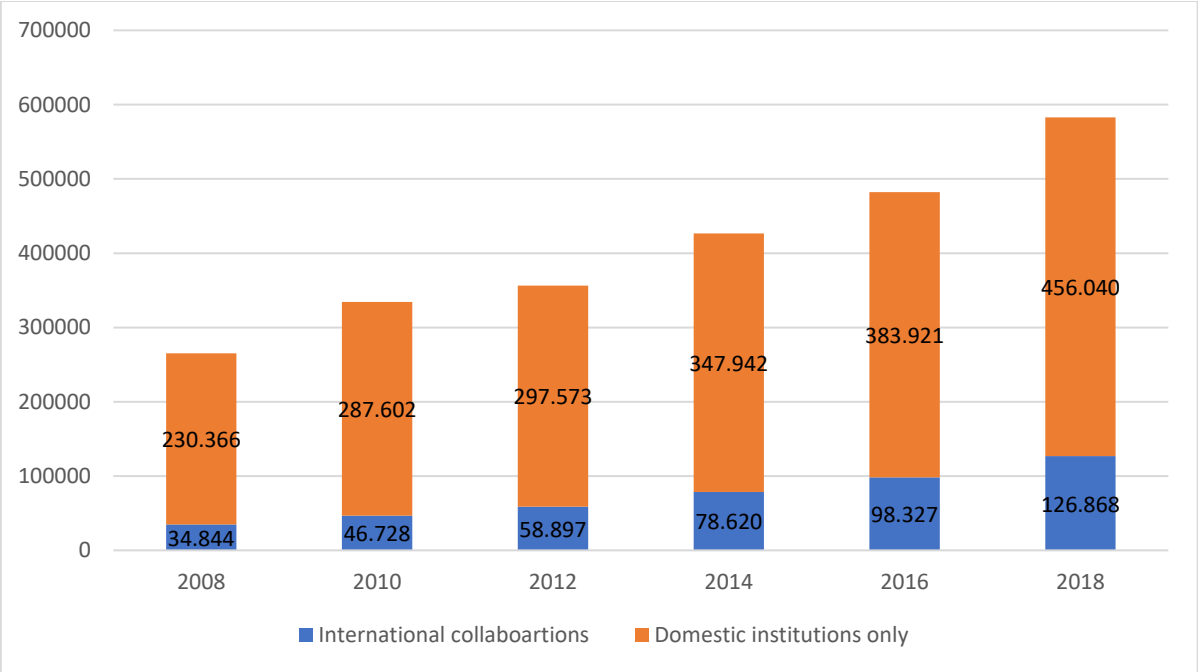

Figure 2. Science and engineering articles published by at least one author affiliated with a Chinese institution

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.

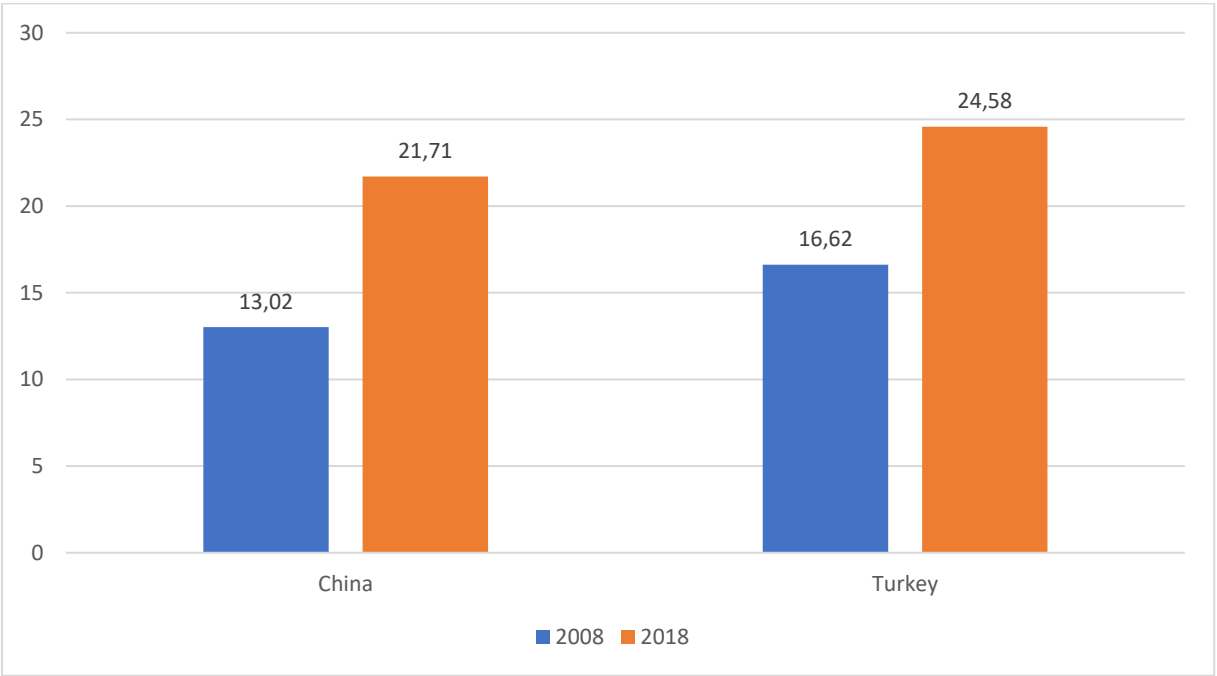

Figure 3. The proportion of internationally co-authored papers to the total number of papers (in %)

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.

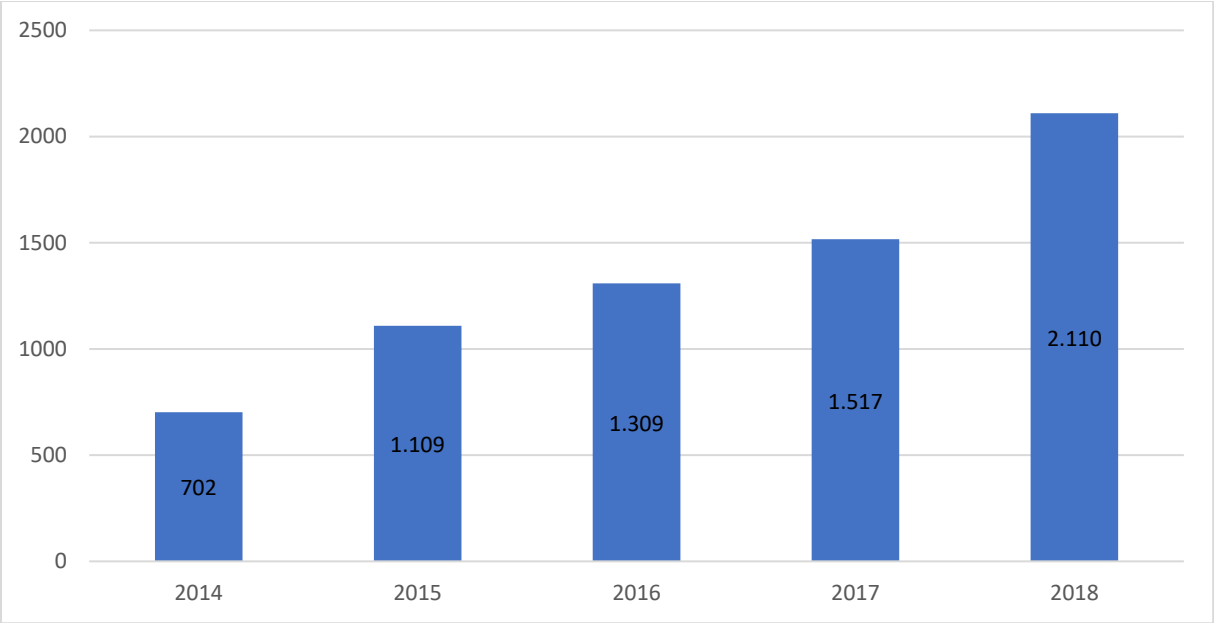

Figure 4. Number of Chinese internationally mobile students in Turkey
Source: Authors, drawing from UNESCO Institute of Statistics data (2021)

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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Intersectoral Engagements of Doctoral Candidates: Regime Discrepancy between Academic Territories

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Abstract

The paper aims to analyse whether and to what extent collaborations of doctoral researchers with the non-academic sectors is determined by their disciplinary affiliation. For this purpose, the paper uses data collected from a survey of doctoral researchers at four universities from three Scandinavian countries. Relying on a critical realist research paradigm, the paper assesses the explanatory power of the Academic Tribes and Territories (ATT) thesis in terms of the relation between disciplinary groups and prevalence of intersectoral research collaborations for doctoral candidates. ATT thesis puts forward, throughout its development over time, two opposing perspectives around the degree of essentiality of disciplines in determining the professional behaviour of academic researchers. The collected survey data is analysed in the paper using a logit regression model. The results from the analysis show that different regimes can be applied to explain the essentiality of different "academic territories" in terms of influencing the intersectoral collaborations of doctoral candidates. On the one hand, for the hard-pure and soft-applied categories of disciplines in Becher-Biglan's typology, the epistemological essentialism proves strongly capable of explaining the prevalence of intersectoral collaborations of doctoral students. On the other hand, in case of the hard-applied and soft-pure disciplines, the contextual factor represented by the country and university variables proves significant, leading to the predominance of social-practice-based understanding of intersectoral research collaboration within those fields.

Keywords: Doctoral education, intersectoral collaboration, collaborative doctorate, academic tribes and territories, epistemological essentialism, social practice

Introduction

Recent decades have seen a steep increase in the number of doctoral degrees awarded every year across most European countries (cf. OECD, 2014). This trend has led to a shrinkage in the share of doctoral graduates getting employment opportunity at the academic sector (Nerad *et al*., 2008; McAlpine & Emmioglu, 2014; Roach & Sauermann, 2017). This is partly due to the fact that the number of academic vacancies have not been increasing at a similar rate to the number of doctoral graduations, which implies that preparing for a career outside academe is now a necessary consideration during doctoral education. Doctoral candidates' perceived preparedness for such career paths, however, is significantly different among academic disciplines (Heflinger & Doykos, 2016). In connection to this, the patterns of employment sector of doctorate holders (cf. European Science Foundation, 2017, p. 42) shows that unlike the case for graduates of social sciences and humanities, graduates of STEM fields who are employed in the academic sector constitute considerably less than half of doctoral graduates.

Engaging in research collaborations with non-academic sectors during doctoral education is one of the most effective ways for doctoral researchers to prepare for transition to a non-academic career after graduation (Thune, 2010). Accordingly, improving the opportunities for such collaborations during doctoral studies becomes a higher education policy target (Nerad *et al*., 2008; Bernstein *et al*., 2014).

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The occurrence of such collaborations, nonetheless, is dependent on various factors, some of which are context-laden and others more inherent in the capacities existent in the academic field. Chikoore *et al*. (2016) found that there exists an association between academics' disciplinary groups and their preferred audience for public engagement. Also, when it comes to engagement with industry, previous research has indicated that disciplinary affiliation plays an important role (Franco and Haase, 2015; Ponomariov, 2008; D'Este and Patel, 2007). Hence, a question can be raised whether the same type of policy can be applied across all the academic fields to achieve an increased level of intersectoral collaboration during doctoral education. In other words, it can be questioned whether the academic discipline is such a significant factor in determining the intersectoral collaboration opportunities for doctoral researchers that would necessitate distinct policies for distinct disciplinary areas. This paper aims at finding an answer to such a question through an empirical, quantitative research based on a survey of doctoral candidates in four universities from three Scandinavian countries.

Building on the Academic Tribes and Territories (ATT) thesis, which over a couple of decades since its inception has witnessed the rise of somewhat opposing theoretical positions within it, this paper seeks to assess the explanatory power of disciplinary groups about the prevalence of intersectoral collaborations among doctoral researchers. While the initial texts on the ATT thesis attributed the disciplinary factor with a high significance in determining the professional behaviour of academics (Becher, 1989), the latest textbook following up the discussions around the same thesis has acknowledged a more important role for the social context in shaping the academics' professional practices (Trowler *et al*., 2012). The appreciation of causal power for the epistemic core of disciplines, then, makes critical realism stand out as the research paradigmatic lens corresponding to the undertaken worldview. This is because critical realism acknowledges that some causal mechanisms emanate from unobservable real structures which are not directly experienced, but have *generative power*, and hence theories around their causal power need to be *retroduced* based on observations. The application of critical realism in the investigation of external engagement of doctoral researchers is theoretically elaborated by Moghadam-Saman (2019). The appraisal of ATT's alternative theories in terms of their capability in explaining the causality around the research behaviour of academics, conforms with the 'retroduction' step in critical realism (cf. Danermark *et al*., 2002). Within critical realism, retroduction refers to a logical inference process in which a set of observations are used to come up with the 'most likely explanation' regarding the underlying mechanisms leading to the generation of the observed event or phenomena (cf. Danermark *et al*., *ibid*; Zachariadis *et al*., 2013). Accordingly, the aim in this paper is to use a set of primary data collected through a survey on intersectoral collaborations of doctoral researchers to analyse, retroductively, the relevance of two main alternative theories within ATT thesis in hinting at mechanisms underlying the occurrence of those collaborations. More specifically, it is intended to investigate whether the disciplinary factor is a significant mechanism in patterning the occurrence of doctoral researchers' intersectoral collaborations.

In order to conduct this investigation, the paper uses Becher's categorization of what became known as the *cognitive dimension* in the ATT thesis, in order to classify the departmental affiliations of the surveyed doctoral researchers. The later revision of the same thesis emphasized the role of contextual factors (as opposed to the disciplinary characteristics) in shaping the professional practices of academics. Based on this, and in order to elucidate the causal power of each of these alternative theories (known in the ATT literature as the *essentialist* versus the *social practice* view), a statistical model is used in which the contextual factor, represented by the country and university variable, is tested as the moderating variable between the disciplinary (independent) and collaboration (dependent) variables. The rest of this paper is organized as follows; the following part reviews the literature around the ATT thesis. Then the next section elaborates on the paper's hypothesis derived from the chosen theoretical framework. Then the adopted statistical methodology and the collected data are explained. The data analysis follows the methodology section, in which the results are also interpreted. A conclusion part discusses the policy implications and limitations of the study.

Theoretical Development

Taking a more general approach to the issue at stake, there has been abundance of findings in the literature emphasizing the prominence of disciplinary differences regarding the collaborative behaviour

of academics (cf. Thune, 2009; Thune *et al*., 2016; D'Este & Iammarino, 2010; D'Este & Fontana, 2007; Perkmann *et al*., 2011; Rentocchini *et al*., 2014; Franco & Haase, 2015; Landry *et al*., 2007; Chikoore *et al*., 2016). These scholarly observations call for taking a theoretical concern on the relation between the characteristics of academic disciplines and the intersectoral interactions of academic researchers, including those of doctoral researchers. Hence, the focus in this section is on the literature that has provided background and foreground for the ATT thesis.

ATT thesis has gained significant empirical backing in the literature due to its ability to explain the professional behaviour of academic researchers across the multitude of disciplines (cf. Braxton and Hargens, 1996; Alise, 2008; Simpson, 2015). This includes both the strong and the weak essentialist view associated respectively with the earlier and later editions of the thesis. Accordingly, Moghadam-Saman (2019, p. 9) has discussed the ATT thesis as having potential in explaining some of the "real" and "contextual" mechanisms (in a critical realist meaning) underlying the intersectoral collaborations of doctoral researchers.

Becher (1987) classified disciplines in four groups including hard-pure, hard-applied, soft-pure, and soft-applied. He elaborated on each of them by further describing them in terms of the nature of knowledge – according to which the aforementioned four groups were respectively described as being cumulative, purposive, reiterative, and functional – and the nature of disciplinary culture – according to which they were respectively described as competitive, entrepreneurial, individualistic, and outward-looking.

The implication of acknowledging a relation between the nature of knowledge and disciplinary culture for the external engagements of academics would then be an area for policy contemplation. This is due to the fact that the differences in the knowledge areas' structures would call for different policy approaches to deal with different disciplinary cultures. Becher (1994, p. 6) himself describes such discrepancies in the following paragraph:

> A comparable contrast can be observed between different disciplinary groups in relation to contract research, where departments in hard applied and soft applied areas are able to earn substantial funds by undertaking sponsored work, while faculty in hard pure areas tend to see this as low-status activity, and others against in soft pure domains seldom have any opportunity to contemplate the choice. The consequences in terms of academic working lives are evident enough. Those who involve themselves in such activities necessarily have closer contacts with the outside world, which they are able to exploit in a variety of ways, including offering their graduates a wider range of job opportunities and using additional earnings to improve departmental resources.

As it reads from this excerpt, Becher considers the exposure level of each of the disciplinary groups in his model to 'contract research' to be substantially different. Such a discrepancy among these groups would imply significantly different level of opportunity for doctoral researchers in terms of external engagements. Therefore, the ATT thesis habors a potential to explain the 'real' structure underlying the occurrence of intersectoral collaborations by doctoral researchers.

Becher's (1989) book constituted the first edition of the ATT thesis, according to which the knowledge structure of disciplines significantly influences the behaviour of academics, and specifically their research practices. According to this original edition of the thesis, the knowledge structure (the epistemological core) of disciplines has a cognitive and a social dimension. The cognitive dimension, in accordance with earlier works by Kolb (1981) and Biglan (1973) divides disciplines into hard-pure, hard-applied, soft-pure, and soft-applied ones. These divisions are also identified respectively with natural sciences, science-based professions, humanities and social sciences, and social professions (Becher, 1994). Becher distinguished between the group identity within each discipline in terms of consensus on the definitions and research problems (questions). Accordingly, he described members of academic disciplines as *tribes* to indicate their cultural foundation. He also used the term *territories* to refer to the boundaries of disciplines to which every tribe belongs.

Becher and Trowler's (2001) book then utilized Becher's both 1987 and 1989 classifications, calling the former one the cognitive dimension, and the latter one the social dimension of disciplinary cultures.

Nevertheless, in this book, which became the second edition of the ATT thesis, the authors point to the changes in the higher education environment that had taken place since the publication of the first book, and its influence on the significance of disciplinary cultures. The authors posited that the disciplinary cultures had evolved to have less influence on the organizational structures, as the mode of knowledge production had started to change to the one in which problem-orientedness and transdisciplinarity are on the rise (termed as *Mode 2* knowledge by Gibbons *et al*., 1994). Furthermore, the book highlighted the influence on the disciplinary cultures from the increasing linkages between university, industry and government in the form of 'triple helix' configurations. Also, contextual influence on the institutions were given more emphasis, rejecting the idea that disciplinary values trickle-down from the leading departments to the "followers" in other universities. The authors made it clear that in this book the academic communities with common intellectual interest are examined in relation to the social and cognitive *contexts* in which they operate.

Still discontent with the continued essentialist view in the second edition, later Trowler (2008) rejected the epistemological essentialist view, starting to develop an alternative approach emphasizing the significance of context and history in understanding social practices. This alternative approach was further elaborated in the third book on the ATT thesis, edited by Trowler, Saunders and Bamber (2012). In this book, the essentialist view predominating the earlier two books on the thesis, was replaced with a *social practice* approach about research practices across disciplines. In this approach, disciplines are seen as open systems susceptible to be influenced by context-specific social characteristics as well as agential and managerialist practices.

Braxton and Hargens (1996, p. 8) question whether the social dimension in Becher's classification is "[…] associated with important scholarly phenomena independently from the associations of the phenomena with the Biglan hard-soft and pure-applied dimensions". They conclude from their survey that the levels of scholarly consensus can explain most of the disciplinary differences. Nevertheless, the authors note that according to their preliminary evidence, the level of consensus, as well as the paradigm development concept, can be integrated with the hard/ soft dimensions. As Creamer (2003, p. 3) puts it briefly, "[r]ates of collaboration are higher in what Biglan (1973) characterized as hard-pure fields where strong agreement exists among faculty about dominant paradigms than in soft-applied fields where there is considerably less consensus about dominant paradigms."

Nevertheless, there can be found more moderate positions taken within the literature regarding the relevance of essentialist view within the ATT thesis. For instance, Pinheiro *et al*. (2012) surveyed academics from 19 departments, which were categorized according to Becher's 1994 four groups of disciplines, investigating their external engagement and its nature and benefits. They conclude, however, that despite the advantages of Becher's categorization of knowledge domains in terms of general patterns of behaviour across organizational settings, the neglect of immediate context, such as national and organizational settings in which academic communities' function, can be considered as a shortcoming. In this regard, the authors find their argument to be rather in line with Trowler *et al*.'s (2012) argument for 'weak essentialism'.

Research Hypotheses

The review presented in the previous section indicates that, having undergone a significant revision, the ATT thesis can be considered as containing what in critical realism terms can be referred to as the alternative proto-theories about the mechanisms underlying the actual phenomena (see Moghadam-Saman, 2019, p. 9). In other words, the epistemological essentialist view and the social practice view, which constitute, respectively, the essence of the earlier and the later versions of the ATT thesis, propose two alternative understandings about the deterministic power of disciplines in shaping the research activities of academics - including the intersectoral research collaborations of doctoral candidates. The empirical corroboration of those alternative theories, aiming at retroductive inference - in a critical realist account - about the external engagement of doctoral candidates, aims at ensuring that the proposed mechanisms adequately represent the real causality (cf. Wynn and Williams, 2012).

The two alternative versions of the ATT thesis can be read through the following substitutive approaches by two of the key figures in the development of the thesis. Firstly, the earlier version of the thesis can be well understood from Becher's (1994, p. 3) held view, stating that:

> Disciplinary cultures, in virtually all fields, transcend the institutional boundaries within any given system. In many, but not all, instances they also span national boundaries. That this is the case can be seen through the existence of national, and often international, subject associations which embody collective norms and exercise an informal control on undergraduate and graduate curricula, as well as providing a shared context for research.

As it can be understood from this excerpt, Becher considered the disciplinary cultures not to be much context-bound, even across *countries*. Accordingly, disciplines can be perceived as playing the role of what in critical realist accounts can be called the "real" structure underlying the mechanisms shaping the academics' professional culture and behaviour.

As mentioned in the theoretical development section, Trowler, who pursued developing the later revision of the ATT thesis, shifted his view later, contending that the role of the disciplines is significantly influenced by the context. It can be said that according to this view, disciplines are considered as constituting a 'transitive' mechanism, meaning that the human 'agency', which is in a mutual interactive relation with its surrounding 'structures', significantly mediates and modifies the causal effect of disciplines. In line with this, Trowler (2008) uses the notion of teaching and learning regimes (TLRs) in order to deconstruct, among the multitude of contextual aspects, those most intimately relevant to the disciplinary practices. In his view, "[…] context is the territory in which disciplines are performed" (Trowler, *ibid*, p. 8).

These two alternative understandings of the ATT thesis provide us with a basis for starting what in Danermark *et al*.'s six-step Explanatory Model of Social Science is referred to as the *retroduction* step (the fourth step), during which the candidate mechanisms underlying the concerned event – here, the intersectoral collaboration of doctoral researchers - are identified[1]. Consequent to this step comes the comparison of the relative explanatory power of the alternative theories and their respective constituent mechanisms (the fifth step in Danermark *et al*.'s model). What will follow this step, i.e. Danermark *et al*. model's sixth step, termed as *concretization and contextualization*, will complete the empirical corroboration to "[…] enhance our descriptions and understanding of the specific contextual conditions under which these mechanisms were enacted." (Wynn and Williams, 2012, p. 15). However, this last step is out of the scope of this paper, as this paper aims only to enquire on whether the epistemological essentialist understanding of academic disciplines, as conceived within the earlier version of the ATT thesis, can explain the patterns of intersectoral engagement for doctoral researchers across different disciplinary groups from different university and country contexts (see again the aforementioned quote from Becher, 1994). This approach, i.e. testing the presence of a specific, retroductively-inferred mechanism, is also in accordance with Miller and Tsang's (2010) approach in theory testing within critical realism. These authors suggest a four-step approach in a CR-based theory testing (in the field of management), which includes *specifying the hypothesized mechanisms*, *testing for the presence of these mechanisms*, *determining whether they function as hypothesized*, and *testing the full theoretical system*. Accordingly, here we address the second and third step in Miller and Tsang's approach by testing for the presence of disciplinary mechanism at the level of "real structures" underlying the mechanisms causing the "event" of intersectoral research collaboration by doctoral researchers, in order to determine whether it functions as hypothesized by the earlier or later versions of the ATT thesis. Accordingly, the following hypotheses are put forward for verification by the empirical data:

Proposition: The cognitive dimension of academic disciplines, as defined in the Becher-Biglan typology, function as a significant influencer of the prevalence of intersectoral engagement by doctoral researchers, and remains significant across countries and universities.

[1] The three steps preceding this step, which include *1- description of events, 2- identification of key components or dimensions, 3- theoretical redescription (abduction) of components or dimensions*, are elaborated in Moghadam-saman (2019).

Accordingly, the null hypotheses and the alternative hypotheses to be tested by the empirical data are formulated as the followings:

Null hypothesis 1: The nature of the cognitive dimension of disciplines does not significantly affect the prevalence of intersectoral engagements by doctoral researchers.
Alternative hypothesis 1: The prevalence of intersectoral engagement by doctoral researchers is significantly affected by the nature of the cognitive dimension of their academic disciplines.

Null hypothesis 2: The country or university context does not significantly mediate the extent to which the nature of academic disciplines affects the prevalence of intersectoral engagements by doctoral researchers.
Alternative hypothesis 2: The impact of academic disciplines on the prevalence of intersectoral engagement by doctoral researchers is significantly mediated by the country or university where the collaboration takes place.

It is necessary to note that, under the critical realist paradigm, an explanation would be complete when it addresses all the three points of a) structures underlying the generative mechanism; b) the outcome these mechanisms tend to generate; and c) the contextual elements that influence the actualization of those generative mechanisms (Cartwright, 2003). The above hypotheses, however, are defined to test one theory regarding only the first of these explanation parts. The way the contextual elements interact with the generative mechanism (the disciplinary effect), and the outcome of these for doctoral researchers, is left out of the scope of this paper, as within critical realism it is arguably preferred to address the complex issue of interaction between contextual and intransitive mechanisms to qualitative studies (Danermark *et al.*, 2002).

Methodology and Data

Following the hypotheses developed in the previous section for testing, hereunder the variables of interest, the data analysis method corresponding to the questions emanating from the hypotheses, and some descriptive features of the data attained through the survey of doctoral researchers in the four Scandinavian universities will be presented. It is noteworthy to mention that, under the critical realist paradigm, the econometric models are deemed as able to reveal only some stylized facts, known as *demi-regularities*, as suggested by Lawson (1997). This means that the hypotheses tested mainly concern the context from which the data are derived, rather than providing a basis for positivist-style generalizations of the findings.

The dependent variable

The dependent variable in this study is to indicate whether doctoral researchers in the sample are – or will be – engaged with the non-academic sectors during their doctoral education. Therefore, the dependent variable is a dummy variable.

Alise (2008) chose to use data on what affiliates of academic disciplines actually *do* (research), rather than *say*, in validating 'Biglan classification'. Similarly, this paper uses the actual occurrence of intersectoral collaborations for the studied doctoral researchers (the empirical layer in the CR ontology) to validate the explanatory power of the ATT thesis (in the form of either of its two versions) regarding the causality potential between disciplines (the layer of real in the CR ontology) and the intersectoral collaborations of doctoral researchers. This will in fact enable the retroductive logic to assess, and if necessary, refine the theories around the underlying mechanisms (the layer of 'real' in the critical realist ontology) which lead to the generation of the actual events (here, the occurrence of intersectoral collaborations for the doctoral researchers). Bozeman and Gaughan (2007) show that grants and contracts from industry and government have a significant effect on academic researchers' propensity to work with industry, albeit the effect from the latter is more moderate. In this paper, collaborations with both private and public sector industry have been included under the overall title of intersectoral collaboration between the academic and non-academic sectors.

The independent variables

Corresponding to the queries raised in the two hypotheses, the two explanatory variables include the disciplinary group to which the doctoral candidates in the sample belong to, and the country and university in which they conduct their doctoral studies. Similar to Robles (1998) and Roy (1979) who equates disciplines with departments in campuses, and Pinheiro *et al*. (2012) who categorize departmental units of a university into the four quadrants of Becher's typology, the disciplinary affiliations of doctoral candidates are here coded into one of the four categories in Becher-Biglan's Typology (see also Neuman *et al*., 2002) based on their departmental affiliation. This coding was done by using the following definitions used by Neuman *et al*. (*ibid*, p. 406) regarding each of the categories in the cognitive dimension of disciplines:

- *Hard Pure*: The nature of knowledge in these disciplines has "cumulative, atomistic structure, concerned with universals, simplification and quantitative emphasis." Examples: physics, chemistry, mathematics, biology.
- *Hard Applied*: The nature of knowledge in these disciplines is "concerned with mastery of physical environment and geared towards products and techniques." Examples: technology, engineering, medicine, design.
- *Soft Pure*: The nature of knowledge in these disciplines has "reiterative, holistic, concerned with particulars and having a qualitative bias." Examples: history, literature, art theory, sociology.
- *Soft Applied*: The nature of knowledge in these disciplines is "concerned with the enhancement of professional practice and aiming to yield protocols and procedures." Examples: education, business studies, law, information management.

Then, in order to investigate the second hypothesis, the country and university in which the doctoral candidates are conducting their studies are coded in the form of a categorical variable.

All in all, from a population of 4213 doctoral researchers in the four universities, a total of 587 responses were received, resulting in a response rate of 13.93%. Per university, the response rates ranged from 8.65% in the case of Gothenburg University to 24.24% in the case of University of Stavanger. Table 1 shows the response rate from each university.

Table 1. Response rate from each of the four universities participating in the survey

University*	**UiS**	**LiU**	**GU**	**AAU**
Total number of doctoral researchers	425	1219	1710	859
Total number of responses	103	140	148	196
Response rate	24.24%	11.48%	8.65%	22.28%

*UiS: University of Stavanger, LiU: Linköping University, GU: Gothenburg University, AAU: Aalborg University

Not only in sum, but also in each individual university, the highest number of responses came from doctoral researchers affiliated with hard-applied (HA) category of disciplines. Table 2 shows the number of responses from doctoral researchers in each university under each category of disciplines.

Table 2. Total number of responses from doctoral researchers affiliated with each of the four disciplinary groups at each university

the name of the university	cognitive dimension				
	HA	HP	SA	SP	Total
Linköping University	52	21	32	35	140
University of Aalborg	141	13	12	30	196
University of Gothenb	80	15	20	33	148
University of Stavang	35	14	24	30	103
Total	308	63	88	128	587

Pearson chi2(9) = 61.5089 Pr = 0.000

The total number of observations for either situation of the dependent variable in terms of the frequencies under each category of disciplines are demonstrated in Table 3. It shows that for all the disciplinary groups, *not* being involved in an intersectoral collaboration is more prevalent, although such a difference

is much more pronounced in the case of 'pure' groups of disciplines compared to the 'applied' groups (in both hard and soft disciplines).

Table 3. Total number of responses from doctoral researchers affiliated with each of the four disciplinary groups at each university, in terms of having or not having intersectoral collaboration*

intersectoral collaboration	cognitive dimension				
	HA	HP	SA	SP	Total
0	185	47	49	93	374
N	123	16	39	35	213
Total	308	63	88	128	587

Pearson chi2(3) = 11.8880 Pr = 0.008

* 0: with no intersectoral collaboration, N: with intersectoral collaboration

If we distinguish between the co-funded and not-co-funded intersectoral collaborations, we see that in all the disciplinary categories, not-co-funded collaborations outnumber the co-funded ones, although such a difference seems to be more pronounced in the 'soft' group of disciplines compared to the 'hard' groups (for both pure and applied disciplines).

Table 4. Total number of responses from doctoral researchers affiliated with each of the four disciplinary groups at each university, in terms of having or not having their collaboration co-funded*

collaboration and funding	cognitive dimension				
	HA	HP	SA	SP	Total
NN	185	47	49	93	374
YN	79	10	31	26	146
YY	44	6	8	9	67
Total	308	63	88	128	587

Pearson chi2(6) = 16.2963 Pr = 0.012

* NN: no collaboration and no funding, YN: collaboration with no (co)funding from the collaborating non-academic entity, YY: collaboration with (co)funding from the collaborating non-academic entity

While these descriptive statistics indicated in the Table 3 and 4 already hint at a potentially significant "patterning effect" of disciplinary groups, the data analysis in the next section aims at providing a more robust (although not *strict*) regularities in the occurrence of collaborations. In other words, the aim is to identify important demi-regularities which can help direct the overall research process in its quest for identification of causal mechanisms later in the qualitative (intensive) study (Lawson, 1997).

Data Analysis and Interpretation of Results

Stata software was used in order to conduct the data analysis for this research paper. The data from the survey of doctoral researchers was stored in spreadsheet format and after coding the data according to the afore-mentioned categorizations - based on departmental affiliations - was transferred (imported) to Stata. All the independent variables were then "encoded" as categorical variables. The dependent variable, i.e., the existence of intersectoral collaboration, was coded as a dummy variable.

Model specification

To run the logistic regression, Stata's *logit* command was used. Since the dependent variable is a dummy (indicating existence or non-existence of intersectoral collaboration) and the independent variables are of indicator (categorical) type, and the moderation effect is also included, the Stata command was specified as in the Tables 5 and 6.

In these tables, the variable cllb denotes the outcome variable which indicates whether the doctoral researcher has a collaboration with non-academic sectors (could be with public sector, with private sector, or both). The variable i.ctry denotes the categorical variable of country where the doctoral student

is based, and the variable i.cogn refers to the category of cognitive dimension of academic discipline according to Becher-Biglan's categorization. The variable i.ctry#i.cogn denotes the moderation effect of country on the pattern-giving effect of disciplinary groups being tested by the analysis.

In order to check whether the case of two Swedish universities makes a difference in the results, the analysis was done once more with using university as the mediating variable (see Table 6). Here, the variable ib2.univ includes the variable denoting the categorical variable of university (i.univ), in which b2 was used to change the base (reference) category into Aalborg University in order to make the results comparable with the previous analysis, where Denmark was the base category for the country variable (which in this case also represented the single university from Denmark).

Model identification and parameter estimation

Table 5 depicts the results gained from Stata after running the aforementioned logit command for specifying the analysis model. As it can be seen from the initial part of the results, the model has merged after four iterations. The likelihood ratio chi-square of 38.86 with a p-value = 0.0001 tells us that our model as a whole fits significantly better than an empty model (i.e., a model with no predictors), or in other words, at least one of the regression coefficients in the model is not equal to zero. The results also showed McFadden's pseudo R-squared value equal to 0.0479, indicating a good fit (Hemmert *et al*., 2018).

Table 5. The results attained from the logit model with country as moderating variable.

cllb	Coef.	Std. Err.	z	P> | z |	[95% Conf. Interval]	
cogn						
HP	-1.07	0.68	-1.58	0.113	-2.41	0.26
SA	-0.21	0.61	-0.34	0.732	-1.40	0.99
SP	0.13	0.40	0.32	0.751	-0.66	0.92
ctry#cogn						
Norway#HA	-0.40	0.39	-1.03	0.305	-1.16	0.36
Norway#HP	0.92	0.85	1.08	0.282	-0.75	2.59
Norway#SA	-0.76	0.75	1.76	0.311	-2.24	0.71
Norway#SP	-1.87	0.65	1.55	0.004**	-3.14	-0.60
Sweden#HA	-0.57	0.25	-2.26	0.024*	-1.06	-0.08
Sweden#HP	-0.22	0.78	-0.28	0.781	-1.75	1.31
Sweden#SA	0.49	0.65	0.76	0.449	-0.78	1.76
Sweden#SP	-1.18	0.46	-2.54	0.011*	-2.09	-0.27
cons.	-0.13	0.17	-0.76	0.449	-0.46	0.20

The output of the two logit models compares respectively two and three groups of the doctoral students with the reference group. In the top section of the both of the output tables, the reference group comprises those doctoral researchers who are affiliated with the hard-applied group of disciplines. By default, Stata chooses the most frequently occurring group to be the reference group, which as indicated earlier, in our sample comprises of hard-applied group. The top section of the output table compares with the base group the other disciplinary groups, i.e., those who are affiliated with hard-pure, soft-applied, and soft-pure disciplines. What matters in the case of this research are the p-values in order to see whether the disciplinary groups matter regarding the probability of having intersectoral collaborations. The co-efficients are hence reported solely for the sake of transparency.

In the bottom section of both tables, the reference group comprises those doctoral researchers who are affiliated with the Aalborg University in Denmark. Hence, the bottom part of the first output table, compares with the base group the doctoral researchers from other two countries, i.e., those who are conducting their doctoral studies in the two universities in Sweden and the University of Stavanger in Norway. In the second table, the bottom section makes a distinction in the Swedish sample between the observations at the GU and LiU.

Arguing about the view of critical realism to regression analysis, Ron (2002, p. 3) holds the position that "[t]he gist of successful regression analysis is not to be able to offer a law-like statement, but to bring forth evidence of an otherwise hidden mechanism". In line with this, he posits that unlike the empiricist interpretation of regression analysis, which uses this method for identifying law-like *regularities* in the observed phenomena, the critical realist interpretation of regression analysis assumes the role of isolating the *mechanism* emanating from the real *tendencies* of underlying structures (here, the epistemic core of disciplines).

Table 6. The results attained from the logit model with university as moderating variable.

cllb	Coef.	Std. Err.	z	P> | z |	[95% Conf. Interval]	
cogn						
HP	-1.07	0.68	-1.58	0.113	-2.41	0.26
SA	-0.21	0.61	-0.34	0.732	-1.40	0.99
SP	0.13	0.40	0.32	0.751	-0.66	0.92
univ#cogn						
Linköping University#HA	-0.26	0.33	-0.79	0.427	-0.91	0.38
Linköping University#HP	0.04	0.83	0.05	0.961	-1.59	1.68
Linköping University#SA	1.27	0.71	1.81	0.071	-0.11	2.66
Linköping University#SP	-1.06	0.53	-1.99	0.046*	-2.10	-0.02
University of Gothenburg#HA	-0.78	0.30	-2.61	0.009**	-1.37	-0.19
University of Gothenburg#HP	-0.67	1.01	-0.66	0.506	-2.64	1.30
University of Gothenburg#SA	0.76	0.78	-0.98	0.329	-2.29	0.77
University of Gothenburg#SP	-1.31	0.56	-2.34	0.019*	-2.41	-0.21
University of Stavanger#HA	-0.40	0.39	-1.03	0.305	-1.15	0.36
University of Stavanger#HP	0.92	0.85	1.08	0.282	-0.75	2.59
University of Stavanger#SA	-0.76	0.75	-1.01	0.311	-2.24	0.71
University of Stavanger#SP	-1.87	0.65	-2.88	0.004**	-3.14	-0.60
cons.	-0.13	0.17	-0.76	0.449	-0.46	0.20

This means that the causal influence of underlying unobservable structures only *tends* to lead to certain patterns, but this might not always actualize as other, contextual mechanisms can hinder that influence. In agreement with this view, the findings from the data analysis in this paper can be interpreted as follows.

- *Essentiality of disciplines' cognitive dimension for doctoral researchers' intersectoral engagements*

The results from the logit model shows that in general, for comparing intersectoral collaboration opportunities of doctoral researchers affiliated with hard-pure, soft-applied, and soft-pure disciplines relative to those affiliated with hard-applied disciplines, the essentialist view cannot explain the differences. The outputs of the logit model shows that the z test statistic for the predictor hard-pure (-1.08/0.68) is -1.58 with an associated p-value of 0.113. If we set the alpha level to 0.05, we would not be able to reject the null hypothesis 1, and hence conclude that the difference between doctoral researchers affiliated with hard-applied and hard-pure disciplines has been found not to be statistically significantly different. Similarly, since the p-values for the soft-applied and soft-pure disciplines are 0.732 and 0.751 respectively, the difference between the intersectoral collaborations of doctoral researchers affiliated with these groups of disciplinary cognitive dimension and the hard-applied group is not significant. Hence, the cognitive dimension of disciplines proves not to be an important factor in determining the pattern of intersectoral collaborations of doctoral researchers.

- *Intersectoral engagements of doctoral researchers in LiU, GU and UiS, relative to AAU*

Despite the general findings regarding the non-suitability of essentialist view of disciplines in describing the intersectoral collaboration opportunities of doctoral researchers in the sample, further breakdown of the sample to doctoral researchers from each of the countries and universities provides a further nuance to the above-mentioned general finding.

For those doctoral researchers in Norway whose academic discipline is in the hard-applied category, compared to the respective reference group, i.e., those affiliated with hard-applied disciplines in the Danish sample, the z test statistic for the predictor Norway#HA (or University of Stavanger#HA in the second table) is -1.03, with an associated p-value of 0.305. By setting the alpha level to 0.05, we fail to reject the null hypothesis 2. In other words, we cannot reject that compared to the base country (Denmark), the prevalence of intersectoral engagement of doctoral researchers from hard-applied disciplines is not significantly different in Norway. However, the same argument does not apply to the case of doctoral students from hard-applied disciplines in Sweden, according to the respective p-value (0.024). Therefore, the results of the logit model imply that when it comes to the hard-applied disciplines, the contextual factors implicit in the country variable do matter in determining the intersectoral collaboration opportunities of doctoral researchers.

Then, according to the output of the logit model in the first table, the prevalence of engagement with non-academic sectors for doctoral researchers from hard-pure and soft-applied disciplines in Norway and Sweden is significantly different from that of their peers in Denmark. Concerning HP disciplines, doctoral researchers' intersectoral collaboration opportunities in Norway and Sweden are not significantly different from those in Denmark (given p=0.282, p=0.781, respectively), thus we cannot reject the null hypothesis 2. Similarly, according to the second table too, the p-values for the SA and HP disciplines for all the three universities compared to the base university are greater than 0.05.

And when it comes to the doctoral researchers from soft-pure disciplines, in the first table for both Norway and Sweden the prevalence of intersectoral engagement is significantly different from Denmark (indicated by p-values of 0.004 and 0.011). Also in the second table, all the p-values for the three universities compared to the AAU, are smaller than 0.05 (0.046, 0.019 and 0.004). Therefore, in the case of doctoral students affiliated to soft-pure disciplines, the null hypothesis can be rejected, implying that the prevalence of intersectoral collaborations, even in the relatively similar context of Nordic countries, varies by the country and university context. This result implies that soft-pure disciplines are - specifically concerning the issue of intersectoral collaborations – (socially) practiced differently, making the opportunities for intersectoral collaboration significantly influenced by the contextual factors.

Here it is worth to mention briefly some background information about collaborative doctorates in the three countries from which the four surveyed universities were selected. Denmark introduced industrial PhD in 1980s, while in Sweden and Norway this type of collaborative doctorate was recognized and regulated during 1990s and 2000s respectively. However, the structure of doctoral education in Norway more closely resembles that of Denmark rather than Sweden (e.g. the initial length of doctoral contracts is usually three years in Norway and Denmark and four years in Sweden). Previous investigations have shown that compared to Sweden, benefitting from the industrial PhD scheme in Norway are less limited to the technical faculties (cf. Kihlander *et al*., 2011; Schlegel & Keitsch, 2016). Accordingly, some of the differences between the level of external engagement by doctoral researchers in the three countries (more specifically the case of hard-applied sciences) can be ascribed to the differences in implementing collaborative doctorate schemes.

Conclusion and Implications

Citing the example of grant-getting and student recruitment, Trowler (2008, p. 6) notes that being able to make distinctions among disciplines regarding their power to condition policy and practice "[…] is important for institutional management, particularly at a time when managerialist approaches are predominant". In agreement with this view, it was the aim of this paper to assess whether the academic disciplinary specifics can explain the differences in prevalence of intersectoral research collaborations

among doctoral candidates. In doing so, the two alternative versions of ATT thesis were considered as substitutive views in terms of the extent of importance attached to the pattern-giving power of disciplines. While the earlier version of the ATT thesis implies that the intersectoral collaborations of doctoral researchers are highly determined by their disciplinary category (or more precisely, its cognitive dimension), the latter version of the ATT thesis implies that the disciplinary effect on those collaborations is mediated by the context in which those disciplines are practiced. The results gained from a survey of doctoral researchers from the four universities in three Nordic countries, however, demonstrates that the answer to the above-mentioned question depends on the specific categories of the disciplinary groups. In other words, each of the essentialist- and social practice-based interpretations of the ATT thesis prove to have more explanatory power for some of the four disciplinary groups.

Based on the above, and similar to the notion of Teaching and Learning Regimes (TLRs) used by Trowler (2002), in this paper the notion of 'regimes of intersectoral engagement' is proposed, based on the attained results, to denote the witnessed difference between the theories applicable to the disciplinary groups. Accordingly, while the *essentialist regime* of intersectoral engagements better corresponds to hard-pure and soft-applied disciplines, the *social practice regime* of intersectoral engagement seems to better explain the engagement opportunities of doctoral candidates within hard-applied and soft-pure disciplines. Hence, HA and SP disciplines are more susceptible to be influenced by getting combined with causal tendencies that emerge as a result of interaction between the disciplinary and contextual factors around the external engagements of doctoral researchers.

A research implication of this approach would be that, in determining the factors important in improving the intersectoral collaborations by doctoral candidates affiliated with HA and SP disciplines, scrutiny is needed in uncovering the contextual mechanisms able to affect the causal power of the epistemic core of these disciplines. For instance, further research should investigate how doctoral programmes defined around specific academic disciplines from these disciplinary groups interact differently in different country- or university contexts with regulatory or policy elements around the issue of intersectoral collaboration.

On the other hand, according to the findings of the paper, for those doctoral candidates affiliated with the soft-applied and hard-pure disciplines, disciplinary characteristics are strong determinants, as the contextual variation seems not to be significantly changing the collaboration opportunity. Accordingly, it can be argued that, for improving the intersectoral collaboration opportunities of those affiliated with these disciplines, it is of higher relevance to introduce interdisciplinarity within the research and education curricula, as the epistemic core of these disciplines seem to be specifically crucial in shaping their potential for providing engagement opportunities. For instance, improving intersectoral collaboration opportunity for doctoral candidates within the field of business administration or mathematics can be achieved through strengthening their knowledge communicability with engineering fields.

A policy implication of the findings of this paper is that, when it comes to the measures aiming at promoting the intersectoral collaborations of doctoral researchers, a distinction shall be made between the disciplinary groups regarding the extent to which their potential for providing opportunity for collaborations are affected by the contextual elements. The results from this study implies that, even in a relatively homogeneous higher education context like the Scandinavian countries of Norway, Denmark and Sweden, the propensity of soft-pure disciplines for intersectoral collaborations of doctoral researchers varies significantly across country and university contexts. Similarly, but to a lesser extent, hard-applied disciplines are also showing a sensitivity to contextual conditions for providing intersectoral collaboration opportunities. Hence, policies aiming at the increase in the level of intersectoral collaborations during doctoral education in these categories of academic disciplines need to be tailored in accordance with the way such disciplines are "practiced" in those contexts.

Following the critical realist epistemology, the findings of this paper need to be understood as ideal-typical middle-range hypotheses (Smith, 2010). This consideration is specifically related to the data sources which were confined within the Nordic context. This means that the proposition that regimes of

engagement are disciplinary-group-driven, and their specific types of regime (essentialist or social practice based) can be further refines through research with data from other contexts. Nevertheless, concerning the studied contexts, as indicated by the results, the HA and SP disciplines appear to be more prone to the influence of contextual specificities, implying that the attained data regarding the intersectoral collaborations of doctoral candidates affiliated with these disciplines can be subject to the specifics of Nordic higher education systems and their industry collaboration traditions. More specifically, the higher prevalence of triple helix collaborations in some of these countries can indicate that university-industry collaborations have higher probability to provide opportunities for doctoral candidates' engagement with industry. Furthermore, the collaboration policies of universities represented by the data in this study add another contextual conditioning layer (or contextual mechanism, in CR terms), as within the national systems, a variety of third mission policies can be applied by universities, affecting the intersectoral engagement opportunities of doctoral researchers.

Availability of Data and Material

The data used for the analysis in this paper are available upon request.

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Quality of Work Life, Organizational Commitment, and Organizational Citizenship Behaviour of Teaching Staff in Higher Education Institutions

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Abstract

This study sets out to investigate the levels of quality of work life, organizational commitment, and organizational citizenship behaviour of teaching staff working in higher education institutions. Moreover, the secondary objective of the study was to determine the correlation among the variables mentioned above. In compliance with the study's objectives, data was collected using questionnaires related to teaching staff's perceptions. The sample consisted of 320 academics working in five foundation and seventeen state universities in Turkey. The data were gathered via an online survey, on a voluntary basis, using convenience sampling method. Descriptive statistics and correlation analysis were carried out using SPSS. Results showed that both quality of work life and organizational citizenship behaviour of teaching staff were high while their level of organizational commitment was moderate. Moreover, correlation analysis revealed that there was a strong positive correlation between the quality of work life and organizational commitment, a moderate positive correlation between the quality of work life and organizational citizenship behaviour, and a moderate positive correlation between organizational commitment and organizational citizenship behaviour. It could be inferred from these results that a high level of quality of work life could create a teaching environment where teaching staff is highly committed to their organizations resulting in advanced quality of education.

Keywords: Quality of work life, organizational commitment, organizational citizenship behaviour, teaching staff, higher education institutions

Introduction

Education has a significant role in the advancement of a nation and its prosperity level in the form of economy and functions as a source for other fields (Singh & Singh, 2015). Higher education has been perceived as an indispensable unit that contributes to different sectors of progress and growth by means of intellectual contribution. In this case, the teaching staff is considered to provide an increase in the span of knowledge that lays the foundation for improving society and the progress of the state (Atta & Khan, 2016). The qualified and skilled teaching staff is an essential factor in the development of a successful educational system. In other words, the quality and competence of teaching staff determine how successful any educational system can be (Joolideh & Yeshodhara, 2008). To achieve competence in teaching staff, specific organizational and individual issues should be addressed to promote the behaviour and attitudes of teaching staff (Atta & Khan, 2016).

To attain a higher standard of education, first, enhanced and flexible working conditions should be provided to teaching staff. In other words, it should be aimed to improve the quality of work life in the institutions to facilitate job performance and maintain reduced level of stress in the working environment (Subbarayalu & Al Kuwaiti, A. (2019). Second, the importance of organizational commitment to boost performance of teaching staff is emphasized in the literature (Park et al., 2005; Allen & Meyer, 1990).

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Teaching staff's level of organizational commitment represents the degree of their satisfaction with the institution, which is crucial to increase job performance levels (Malik et al., 2010). Third, organizational commitment helps teaching staff exhibit positive behaviours that are not scripted by the job entitlement, be more helpful and respectful to their colleagues. This kind of behaviour is not reinforced by the existing reward system of the organization but is related to the intrinsic motivation of the individual, which is often described as organizational citizenship behaviour (Bienstock et al., 2003).

All in all, to achieve success in higher educational institutes, teaching staff should be motivated to maintain a high level of performance. On this point, three factors essential to enhance the performance of teaching staff are quality of work life, organizational commitment, and organizational citizenship behaviour. The following section presents the definition and discussion of the aforementioned terms within the scope of existing literature.

To conclude, universities could benefit from employees when they have high levels of quality of work life, organizational commitment, and organizational citizenship behaviour. On the other hand, the teaching staff in higher educational institutions deal with many problems, including having to educate a higher number of students. (Subbarayalu, A. V., & Al Kuwaiti, A. (2019) The quick increase in the number of students who seek to study higher education is at an undeniable level. According to Higher Education Information Management System's statistics, while the total number of students registered at a university was 5.472.521 in 2014, with the growing demand for higher education, it has become 8.240.997 in 2021 (Council of Higher Education, 2021). In this regard, it is essential to focus on these factors to enhance the educational quality of a university.

The points discussed under the umbrella term of organizations can easily be applied to higher education institutions where the mind of the youth and skilled is shaped, the knowledge necessary for the prosperity of nation blossom, and integration of information and industry meet each other. Therefore, this study aims to determine teaching staff's levels of quality of work life, organizational commitment, and organizational citizenship behaviour and correlation among them. For this purpose, the following research questions are addressed:

1. What are the levels of quality of work life, organizational commitment, and organizational citizenship behaviour of teaching staff working in higher education institutions?
2. Is there a correlation between the quality of work life, organizational commitment, and organizational citizenship behaviour of teaching staff working in higher education institutions?

Quality of Work Life

Quality of work life (QoWL) is a broad and multidimensional term makes it difficult for researchers to reach a long-term agreement on the definition of the construct. Generally, it is defined as the well-being of employees (Danna & Griffin,1999). It can also be described as enhancing the working conditions of employees and creating a work environment that supports not only physical but also employees' psychological and social needs (Demir, 2011). Nadler and Lawler (1983) defined quality of work life as a system of philosophy consisting of employees, work, and organization. Moreover, it has also been explained as a stress-free working environment (Warr,1987) and increasing employees' job satisfaction by involving them in management (Sirgy et al., 2001). Lau et al. Similarly, according to Lau et al. (2001), quality of work life improves job satisfaction by providing rewards, a safe working environment, and career development opportunities to employees. Huzzard (2003) identified QoWL as humanizing work by improving working circumstances, conserving employees, and constructing a democratic work environment.

The foundation of QoWL was based on Maslow's hierarchy of needs theory. Maslow put forward that there are five essential needs that exist in each individual (Maslow, 1954). Several other theories following Maslow's have considered QoWL due to employee satisfaction grounded by lower and higher-order needs (Alderfer, 1972; Herzberg, 1987). The former consists of security, health, and economic needs, while the latter comprises social, esteem, knowledge, and self-actualization needs. Sirgy et al. (2008) demonstrated that the main reason for employee satisfaction originates from the fulfillment of the lower order needs. However, World Health Organization built a more inclusive

framework that promotes implementations that secure, support, and positively improve not only physical but also mental and social well-being of employees (Burton, 2010).

Quality of work life's effects are related to many factors that can be applied to staff, and some of these factors are work satisfaction, career development, enhanced work performance, workload, autonomy, and productivity. Most of these factors could be related to the academic field of employees (Ngcamu, 2017). The American Society of Training and Development claims that improving QoWL is basically a core idea consisting of creating values. It aims to achieve both advanced effectiveness of institutions and a high level of QoWL for employees (Skrovan,1980). Based on research, it can be said that QoWL leads to increased work performance, job satisfaction, formation of organizational identity, reduced absenteeism, and intention to quit with less likelihood of experiencing burnout (Donalson,2000; Pedler et al., 2001; Waitayangkook, 2003; Pfeffer, 2004, Kheirandish, 2009). All in all, these effects help to create an efficient and effective organization.

Researchers in Turkey carried out studies to see how different factors influence QoWL in educational organizations. Kösterelioğlu (2011) found out a negative significant relationship between QoWL and work alienation. Yalçın and Akan (2016) revealed not only leadership styles of the administration affected teaching staff's QoWL but also indicated that many of the managerial staff in the study adopted transformational leadership. Demir (2016) also established a positive significant relationship between QoWL and organizational commitment. However, these studies were generally conducted in primary or secondary level education institutions, which leads to a need for research in higher education context.
In conclusion, quality of work life can be described as the humanization of work by providing employees a stress-free work environment that they can cherish, fulfill not only their physical but also mental and social needs. Research has proved that increasing job satisfaction and job performance of teaching staff are entitled to the enhancement of quality of work life. In other words, it is aimed to have high standards of education through achieving high quality of work life.

Organizational Commitment

The teacher is a fundamental part of an educational system with several essential liabilities. The teachers and, ultimately, their level of commitment and job satisfaction are the factors that determine the overall performance of the universities. Therefore, organizations should pay more attention to comprehend teachers' attitudes and behaviours (Tsui & Cheng, 1999). Commitment refers to an attachment to the goals and merits of an organization (Buchanan, 1974). Accordingly, organizational commitment is described as firmly believing in the aims and values of an organization and being ready to make an effort for the sake of it (Porter et al., 1974). Allen and Meyer (1990) categorized organizational commitment into three dimensions as affective, continuance, and normative commitment. Affective commitment can be described as being emotionally attached to the organization with the result of employees' identification of themselves with the organization and enjoyment of being a part of it. Continuance commitment is about the cost if the employee decides to leave the organization, while normative commitment is related to how the employees hold themselves responsible for staying in the organization (Allen & Meyer, 1990).

In the light of previous research conducted on organizational commitment, it could be emphasized that organizational performance is influenced positively by the high levels of commitment of the employee (Freund & Carmeli, 2003). It could also be inferred form this genre of research that when the members of educational organizations are highly committed, they keep working at their organizations to maintain their involvement. Furthermore, employees spend most of their efforts to display high-performance levels in their organizations (Chughtai & Zafar, 2006). In parallel, organizational commitment was found to be highly important for the organization since high levels of organizational commitment result in a decrease in the absenteeism rate and turnover ratio while facilitating productivity in the institution (Jernigan et al., 2002). Therefore, within the scope of research proving that organizational commitment is linked to the success of an institution, the employee should be supported in terms of enhanced organizational commitment (Aube et al., 2007).

Organizational commitment (OC) has been a research subject with its relationship to many factors. These factors include leadership styles of the administrative staff, organizational justice, problem solving skills, teaching staff's justice and ethics perceptions, organizational trust and teacher leadership (Tan, 2012; Babaoğlan & Ertürk, 2013; Bozdemir & Yolcu, 2014; Demirhan & Karaman, 2015). Tan (2012) found out that team leadership behaviours significantly predict OC. Moreover, Babaoğlan and Ertürk (2013) concluded that there is a moderate positive relationship between teachers' organizational justice perceptions and their OC. According to Bozdemir and Yolcu's study, there is a significant negative relationship between OC and problem-solving skills. Furthermore, Demirhan and Karaman (2015) revealed that a significant relationship exists between teaching staff's OC and their distributive justice perceptions. However, QoWL is not one of the subjects that has been widely researched with its relationship to OC, so the present study tries to contribute to the gap in the literature.

In brief, organizational commitment refers to the employees' attachment to an institution, which leads the employee to show efforts for high-level performance. Research upon the benefits of a high organizational commitment level stated that it is linked to the productivity of an organization. Moreover, high levels of organizational commitment result in low rates of the absence of employees who prioritize their work over personal interests (Meyer & Allen, 1991). Organizational commitment facilitates the growth of individual behaviour, which indicates completion of the formal requirements of the institution, cooperation, respect, and assistance.

Organizational Citizenship Behaviour

Organizational citizenship behaviour is defined as an extra-role behaviour that leads the employees to take extra responsibility for teamwork even though they are not officially mandated for such activities. This kind of behaviour occurs as the result of voluntary action and the employee's wish to contribute to the organization (Jacqueline et al.,2004). Organizational Citizenship Behaviour is displayed with intentions to enhance the productivity and the effectiveness of the organization as well as goals individually set by each employee (Castro et al., 2004). In addition, Organ, Podsakoff, and MacKenzie (2006) claimed that organizational citizenship behaviour could be defined as a type of behaviour of employees willing to complete the tasks that are not officially requested. Moreover, it could be explained as individual behaviour based on volunteerism which results from working voluntarily even without no rewarding system to promote success and productivity of an institution. (Organ, 1997, p. 85).

Based on research upon the benefits of organizational citizenship behaviour, it could be revealed that the presence of organizational citizenship behaviour was found to be beneficial for increasing organizational function as a consequence of the emphasis on individual freedom to make decisions (Bienstock et al., 2003). Furthermore, the findings of a study indicated that organizational citizenship behaviour is linked to extra-role behaviour, including being willing to attend a class meeting or a lecture on behalf of a colleague who has health issues. Moreover, it consists of readiness to complete extra tasks and loyalty to the organization (Ertürk, 2005; Ngadiman et al., 2013). Organizational citizenship behaviour also affects the employees' feelings towards cooperation with the organization to promote productivity, quality, and customer satisfaction (Noor, 2009). In this regard, extra-role behaviour leads to an increase in the teaching satisfaction services, which contributes to universities' teaching quality (Lara, 2008).

Moreover, a study conducted by Karacaoğlu and Güney (2010) demonstrated a weak positive relationship between the teachers' organizational commitment and organizational citizenship behaviours (OCBs). Atakan-Duman et al. (2013) claimed that there was a significant positive relationship among OC, OCB, and organizational identity perception. Yorulmaz and Çelik (2016) demonstrated that a positive relationship exists between OC and OCB while the relationship between OC and organizational cynicism was negative. OCB and organizational cynicism also displayed a significant negative relationship. Sökmen et al. (2017) concluded that the effect of organizational culture on OCB and OC was weak and positive while the effect of OC on OCB was moderate and positive. Despite the frequent instances of research focusing OC and OCB with regards to different factors, QoWL has not been one of the factors, which necessitates the present study focusing on the relationship among QoWL, OC and OCB.

All in all, organizational citizenship behaviour is defined as the non-task behaviour of employees who volunteer to take the initiative on behalf of others, manage extra tasks, and seek opportunities to contribute to the increase in productivity of the organization. This kind of behaviour was found to be effective in terms of improving teaching quality at a university. In other words, it could be concluded that the quality of education will increase when employees perform organizational citizenship behaviour in an organization.

Methodology

This research was designed as correlational research. Correlational research is a nonexperimental research type which promotes prediction and interpretation of a relationship between variables (Seeram, 2019). The study group of the research consisted of 320 academics working in state and foundation universities in Turkey. Due to pandemic conditions, the data were collected through an online survey, on a voluntary basis, with a random, convenience sampling method. Demographic characteristics of the study group are presented in Table 1.

Table 1. Demographic distribution of data

Variables		f	%
Gender	Female	164	51.3
	Male	156	48.8
University Type	Foundation	64	20.0
	State	235	73.4
	Not specified	21	6.6
Marital Status	Married	219	68.4
	Single	101	31.6
Title	Research assistant	52	16.3
	Instructor	161	50.3
	Assistant Professor	56	17.5
	Associate Professor	27	8.4
	Professor Doctor	24	7.5
Educational Status	Bachelor	54	16.9
	Master	108	33.8
	PhD	158	49.4
Field	Social Sciences	261	81.6
	Physical Sciences	59	18.4

The data of the study were collected using the "Quality of Work Life Scale," which was adapted into Turkish to be used in educational institutions by Akar and Üstüner (2017) based on the work life quality scale developed by Van Laar, Edwards, and Easton (2007). QoWL Scale consisted of 23 items and 6 factors with sub-dimension factor loads varying between .33 and .97. Cronbach's alpha value was calculated as .93 by Akar and Üstüner (2017). The second scale utilized in the study was "Organizational Citizenship Behaviour Scale" (Belenkuyu & Yücel, 2017), which was developed as a result of repeated research by Yücel and his students (Atalay, 2005; Dönder, 2006; Kayan, 2008; Kaynak, 2007; Keskin, 2005; Mercan, 2006; Samancı, 2007; Ünal, 2003). OCB Scale consisted of 17 items and 4 factors with sub-dimension factor loads varying between .54 and .86 (Atalay, 2005). Cronbach's alpha value was calculated as .84. Last scale utilized in the study was "Organizational Commitment Scale" developed by Üstüner (2009). OC Scale consisted of 17 items and 1 factor with item factor loads varying between .43 and .75. Cronbach's alpha value was calculated as .96 by Üstüner (2009). The structural properties of the scales were preserved by adhering to the results of the construct validity analysis presented in related studies, and the data collected in this study were examined for reliability (see Table 2). The obtained Cronbach alpha coefficients show that the measurement is quite reliable.

In the analysis, descriptive statistics were used for the first research question. Since the skewness and kurtosis values were in the range of -1.5 and 1.5, the data has normality conditions; thus, Pearson correlation analysis was utilized for the second research question.

Table 2. Reliability analysis results

Factors	Cronbach's Alfa
Job-Career satisfaction	.776
General well-being	.885
Control over work	.859
Working conditions	.812
Stress-free working environment	.896
Family-work life balance	.779
Quality of Work Life (Total)	.950
Organizational Commitment (Total)	.977
Conscientiousness	.869
Civic Virtue	.890
Altruism	.884
Sportsmanship	.782
Organizational Citizenship Behaviour (Total)	.936

Results

In this section, results of descriptive statistics and Pearson correlation analysis are presented. Table 3 depicts the levels of quality of work life, organizational commitment, and organizational citizenship behaviour of teaching staff working in higher education institutions.

Table 3. The Levels of Quality of Work Life, Organizational Commitment and Organizational Citizenship Behaviour of Teaching Staff Working in Higher Education Institutions

Factors	Mean ($\bar{X}$)*	SD
Job-Career Satisfaction	3.76	.76
General Well-Being	3.55	.89
Control over Work	2.86	1.14
Working Conditions	3.33	1.13
Stress-Free Working Environment	3.5	1.18
Family-Work Life Balance	3.66	1.01
Quality of Work Life (Total)	3.5	.81
Organizational Commitment (Total)	2.78	1.13
Conscientiousness	4.07	.75
Civic Virtue	3.46	1.00
Altruism	3.81	.90
Sportsmanship	3.64	.95
Organizational Citizenship Behaviour (Total)	3.75	.76

* 1-1.80: very low; 1.81-2.60: low; 2.61-3,40: moderate; 3.41-4.20: high; 4.21-5.00: very high.

The result of data regarding the quality of work life reveals that teaching staff's level of quality of work life is at a "high" ($\bar{x}$=3.5) level. It can also be concluded that the mean for control over work, one of the sub-dimensions of quality of work life, is lower than other dimensions. According to the table, it can also be said that the organizational commitment level of teaching staff is "moderate" ($\bar{x}$=2.78). Additionally, the results show that the organizational citizenship levels of teaching staff are at a "high" ($\bar{x}$=3.75) level. Specifically, the conscientiousness dimension is higher than other dimensions.

Table 4. The matrix of Pearson Product Moment Analysis (n:320)

	Consc.	Civic Virtue	Altruism	Sportsmanship	OCB (Total)	Organizational Commitment (Total)
Job-Career Satisfaction	,343**	,367**	,406**	,461**	,458**	,828**
General Well-Being	,316**	,289**	,326**	,364**	,376**	,648**
Control over Work	,222**	,314**	,311**	,367**	,355**	,852**
Working Conditions	,212**	,284**	,282**	,385**	,336**	,851**
Stress-Free Working Environment	,024	,166**	,159**	,300**	,182**	,649**
Family-Work Life Balance	,161**	,219**	,265**	,356**	,285**	,635**
Quality of Work Life (Total)	,282**	,337**	,363**	,448**	,413**	,880**
Organizational Commitment (Total)	,278**	,404**	,394**	,452**	,448**	1

*Significant at the 0.05 level.
**Significant at the 0.01 level.

According to the Table 4, it could be said that there is a moderate positive correlation between job-career satisfaction and conscientiousness (r= .343; p<.01), civic virtue (r= .367; p<.01), altruism (r= .406; p<.01), sportsmanship (r= .461; p<.01). The correlation between job-career satisfaction factor and total organizational commitment (r= .458; p<.01) are moderate and positive while it is strong and positive with total organizational commitment (r= .828; p<.01).

Based on the results of Pearson Product Moment Analysis, there is a weak positive correlation between general well-being and civic virtue; a moderate positive correlation in regards to conscientiousness (r= .316; p<.01), altruism (r= .326; p<.01), sportsmanship (r= .364; p<.01), total organizational citizenship behaviour (r= .376; p<.01), and total organizational commitment (r= .648; p<.01).

Regarding the results of Pearson Product Moment Analysis, it can be concluded that there is a weak positive correlation between control over work and conscientiousness (r= .222; p<.01); moderate correlation between control over work and civic virtue (r= .314; p<.01), altruism (r= .311; p<.01), sportsmanship (r= .367; p<.01), total organizational citizenship behaviour (r= .355; p<.01); strong positive correlation between control over work and total organizational commitment (r= .852; p<.01).

According to the results of correlation analysis, a weak positive relationship exists between working conditions and conscientiousness (r= .212; p<.01), civic virtue (r= .284; p<.01) and altruism (r= .282; p<.01). Additionally, a moderate positive correlation was found between working conditions and sportsmanship (r= .385; p<.01) as well as total organizational citizenship behaviour (r= .336; p<.01). Lastly, there is a strong positive relationship between working conditions and total organizational commitment (r= .851; p<.01).

Regarding the next factor, there is no significant correlation between stress-free working environment and conscientiousness. However, a weak correlation exists between this factor and civic virtue (r= .166; p<.01), altruism (r= .159; p<.01) and total organizational citizenship behaviour (r= .182; p<.01). There is also a moderate positive correlation regarding sportsmanship (r= .300; p<.01) and total organizational commitment (r= .649; p<.01).

Family-work life balance factor's analysis yields similar results. The correlation between family-work balance and conscientiousness (r= .161; p<.01), civic virtue (r= .219; p<.01), altruism (r= .265; p<.01) and total organizational behaviour (r= .285; p<.01) is weak and positive. However, sportsmanship (r= .356; p<.01) and total organizational commitment (r= .635; p<.01) are in a moderate positive correlational relationship with family-work life balance.

According to the table, total quality of work life is in a weak positive correlational relationship with conscientiousness (r= .282; p<.01); a moderate positive one with civic virtue (r= .337; p<.01), altruism (r= .363; p<.01), sportsmanship (r= .448; p<.01) and total organizational citizenship behaviour (r= .413; p<.01). Moreover, there is a strong positive correlation between quality of work life and organizational commitment (r= .880; p<.01).

Finally, results of the analysis shows that there is a weak positive correlation between organizational commitment and conscientiousness (r= .278; p<.01); moderate positive correlation between organizational commitment and civic virtue (r= .404; p<.01), altruism (r= .394; p<.01), sportsmanship (r= .452; p<.01) and total organizational citizenship behaviour (r= .448; p<.01).

Discussion

The relationship between quality of work life, organizational commitment, and organizational citizenship behaviour of teaching staff in higher education institutions were examined. This study indicates that the levels of quality of work life and organizational citizenship behaviour of teaching staff are high. Nevertheless, the organizational commitment level for academics was found out to be moderate.

First, the quality of work life for teaching staff working in higher education institutions is high. Teachers' multicultural knowledge and management's transformational leadership style are some factors that lead to this high level of quality of work life. However, some research results displayed moderate levels of quality of work life in an educational context (Sturman, 2004; Jofreh et al., 2013; Swathi & Reddy, 2016). Moreover, the present study revealed similar results with the literature regarding organizational commitment. The organizational commitment levels of the teaching staff were found to be moderate in this study in parallel with studies conducted by Demirhan and Karaman (2015) and Yorulmaz & Çelik (2016). Lack of organizational cynicism helped the personnel keep a healthy level of organizational commitment. Lastly, organizational citizenship behaviour levels of the teaching staff were determined to be high in higher education institutions, which supports the findings of similar research (Jafari & Bidarian, 2012; Nafei, 2014; Yorulmaz & Çelik, 2016). According to the research, the existence of organizational justice could be one of the key points to boost this type of findings.

The study also found out that there is a strong positive correlation between the quality of work life and organizational commitment, a moderate positive correlation between the quality of work life and organizational citizenship behaviour, and lastly, a moderate positive correlation between organizational commitment and organizational citizenship behaviour. Providing a democratic work environment for the staff, the existence of positive social interactions, a fair and just rewarding system as well as being responsible in terms of administrative topics can be some of the contributing factors of these results. This study depicts a moderate positive correlation in terms of the correlational relationship of quality of work life and organizational citizenship behaviour. According to Kasraie and colleagues' (2014) and Pio and Tampi's (2018) studies, creating an almost stress-free working environment and a high level of job satisfaction promotes QoWL and OCB. Lastly, organizational commitment and organizational citizenship behaviour were found to have a moderate positive correlation in this study. Having a culture within the organization can help to improve these points. Having employees who are committed to the organizations normatively and affectively would continue working in their already well-structured positions, help others to orient and perform in an efficient and highly productive way. With these factors, teaching staff with high organizational commitment would also show high organizational citizenship behaviour leading to a positive relationship between them.

In conclusion, this research revealed that quality of work life, organizational commitment, and organizational citizenship are interrelated concepts. Being the first one strongly correlated with the second, it would be wise to suggest that institutions that aim to reach an advanced level of education may start with quality of work life and organizational commitment. Teaching staff who enjoy being in the organization would like to stay in it as long as they have a democratic working environment with little or no formal procedures. Institutions should try and make their personnel feel as little stress as possible, have enough time to spend with their families together, with providing enough support for academic and personal development within the field. With these cautions taken, quality of work life, organizational commitment, and organizational citizenship behaviour levels of their staff would go up together with the organization's success and development.

Even though the present study was designed and organized with detailed procedures, it may possess some limitations. The study was conducted during quarantine time distance education, and it is an inferential one based on quantitative data. Further research may benefit from a stratified sampling method and qualitative inquiry to have more external validity; understand and explain more how quality of work life, organizational commitment and organizational citizenship behaviour affect the performance of academic staff.

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Internationalization of Higher Education in Southeast Asia: A Systematic Literature Review

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Abstract

This study adopted the research method of systematic literature review to map out the landscape of existing academic resources about internationalization of higher education (IHE) within the geographical context of Southeast Asia (SEA), in order to contribute to higher education development in the region and encourage more contributions from future scholars and researchers. By conducting literature search via the online database of ERIC (EBSCOhost), 56 publications were qualitatively analysed which helped answer the four research questions set out in this research study. With the identification of the common themes covered by existing literature about IHE within SEA, specific directions can be provided for the academia in considering which areas about IHE within SEA need further study. With clearer directions on the area for further studies, the academia can then provide more specific support in both intellectual and practical dimensions to continue driving IHE in SEA.

Keywords: Internationalization in higher education, Southeast Asia, systematic review, systematic literature review, higher education research

Introduction

Globalization affects every facet of our society, and the higher education sector cannot escape from this force which had and will continue to shape its landscape (Green, Marmolejo & Egron-Polak, 2012). It is under this context that higher education institutes (HEIs) around the world promote internationalization to maintain competitiveness and catch up with the rest of the world (Altbach & Knight, 2007; Williams et al., 2020). As HEIs are molded by the two mutually influencing forces of globalization and internationalization, internationalization of higher education (IHE) comes to play as a relevant topic to the development of higher education. Over the years, the process of IHE has been driven by actors such as international and regional organizations, such as the Asian Development Bank, and others (Chao, 2018), national policies including development in information technologies and funding in education (Chadee & Naidoo, 2009; Kosmutzky & Krucken, 2014) and changes in international relations such as decolonization, the fall of the Soviet Union and the establishment of the European Union (EU) (Chen & Barnett, 2000; de Wit & Merkx, 2012; de Wit et al., 2015). With IHE picking up more momentum in the late 1990s and early 2000s, interests towards the topic began to grow among academics in the North America and Europe (Teichler, 2003). Countries such as the United States and Australia rose to dominate the field in terms of publications about their own experiences and also on foreign soil including Asia-Pacific (Can & Hou, 2020; Gumus et al., 2020; Liu et al., 2019). Although the research community in Asia on this field is growing, it has been led by certain East Asian countries and the contributions from Southeast Asia (SEA) countries remain limited (Jung & Horta, 2013; Jung et al., 2018). While SEA countries such as Malaysia and Thailand are attempting to share a piece of the pie in IHE, it is important to understand more about the knowledge production on IHE in this region in order to facilitate further progress on internationalization (ASEAN SOM-ED, 2016; SHARE EU

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ASEAN, 2020; The ASEAN Post, 2019). This research is designed to contribute in this regard and by doing so, stimulate discussion among academia and encourage more contributions to support IHE in SEA.

This research aims at analysing existing literature on the topic of IHE within the contexts of SEA. It will be doing so, focusing on the following four research questions:

1. Which country(s)/which author(s) produced the most literature on IHE within SEA?
2. Which country(s) is/are targeted for research in the literature on IHE within SEA?
3. What are the research methods adopted in the literature on IHE within SEA?
4. What are the common themes covered by the literature on IHE within SEA?

By conducting a systematic review on these literature, this project will identify the themes about IHE in SEA that have already been studied on, and hence highlight the areas that are calling for more contributions from the academia in both theoretical and empirical dimensions. With clearer directions on the scope for further studies, the academia can provide more specific support intellectually and practically in driving IHE in SEA.

Literature Review

Definitions and Trends of IHE

IHE was described as "a broad umbrella term" which touched upon various areas and perspectives (de Wit et al., 2015, p. 45). The most mentioned definition of the term is from Knight (2004) in which she interpreted IHE as a process for higher education sector to embrace an "international, intercultural or global dimension" (p. 11). Hawawini (2016) further expanded the definition to acknowledge the dimension where HEIs were integrating into the "global knowledge economy" through the process of internationalization (p. 5). Summarizing both inward and outward ways of looking at IHE, Hudzik (2014) suggested the ideas of "comprehensive internationalization" which covered not only the internal changes within the HEIs during the process of internationalization, but also their external images and relationships with other institutes (p. 7). In general, the academia sees IHE as a concept that comprises different approaches and strategies, with an ever-changing landscape and is recognized as complex and volatile in nature (Cheng et al., 2016; de Wit & Merkx, 2012; Ennew & Greenaway, 2012).

Under the concept of IHE, there are two common elements that are always referred to, namely movement of students and academic staff, and reforms in curriculum or program structure. Through analyses of historical trends and the experiences of IHE across different countries, HEIs were seen to adhere to encourage student or staff mobility around the world and restructure curriculum in ways to increase students' and staff's international exposure or partnership with foreign HEIs (Altbach & Knight, 2016; Altbach & Teichler, 2001; de Wit & Merkx, 2012; Egron-Polak, 2012; Knight, 2004; Teichler, 2017). Regarding the reforms in curriculum, Enders (2004) also highlighted that IHE could trigger broader policy reforms in the national level for some countries. With these rationales in mind, HEIs can then translate them into various strategies that facilitate knowledge transfer across countries, including the provision of joint degrees and programs, designing development plans to create regional education hubs and the establishment of regional cooperation platforms (Cheng et al., 2016; Cheung et al., 2016; Egron-Polak, 2012; Rumbley, Altbach & Reisberg, 2012; Teichler, 2004; Teichler, 2009). In short, IHE can be summarized into the following three levels. First, in the level of human resources, HEIs encourage their students and academic staff to have exchange, to visit, study or work in HEIs located in other countries. Second, in the institutional level, HEIs provide cross-border programs or establish cross-border branch campuses. Third, in the national level, countries engage in transnational cooperation by opening dialogue, signing regional agreement or even launching transnational platforms to enable HEIs to work with other overseas peer institutions.

In recent years, there are some notable trends on IHE. Back in the early 2010s, Green, Marmolejo & Egron-Polak (2012) summarized three global trends that were likely to reshape IHE in the decades to come. These included the rise in population that increased the demand for higher education, privatizations for HEIs and the technological advancement that opened up more opportunities for implementing new internationalization strategies. After almost a decade, these trends are still evident

today as they continue to make an impact on IHE (de Wit & Altbach, 2021). The rising trend of online international teaching and learning, as acknowledged by de Wit et al. (2015), is also being intensified by the COVID-19 pandemic. In terms of geographical focus, scholars have also noted the rising importance of developing countries in recent years. With an ascending demand for higher education and a growing capacity in research and development, countries in continents outside of North America, Europe and Australia are taking up more significant roles in the discourse of IHE around the world (de Wit & Merkx, 2012; Hudzik, 2014; Kehm & Teichler, 2007). In IAU's 5th global survey published last year, Asia-Pacific was considered the top and second priorities for North American and European HEIs in internationalization respectively, reflecting the weighty role taken up by the region in IHE (Marinoni, 2019).

Knowledge Production on IHE

The field of IHE is one of the branches of higher education research, which saw a rapid growth in publications starting in the early 2000s, led predominantly by researchers from North and Central America and Europe (Horta, 2018). Despite being at a developing stage in terms of capacity and contributions compared to North America and Europe, studies revealed that the higher education research community, with certain East Asian countries such as Hong Kong, China and South Korea leading the way, was on the rise and had the potential to play an even bigger role in the academia (Jung & Horta, 2013; 2015).

Similarly, the field of IHE is also under the dominance of North American and European scholars. Emerging from Europe as early as the Middle Age, the concept of internationalization was spread to colonies around the world and until the 20th century, with the United States became the most popular destination for overseas exchange and study, the focus of IHE was almost fixed solely on both Europe and the US, resulting in the dominance of European and American researchers in this field (de Wit & Merkx, 2012). The "imbalances in international mobility", as argued by Egron-Polak (2012), explained the findings from various studies that Western powers, most notably the US, the United Kingdom, Canada and even Australia had dominated the knowledge production in one of the most significant elements of IHE (Gumus et al., 2020; Williams et al., 2020). Although Asian countries such as Hong Kong, China and Japan were following the Western countries as the next major contributors in this field, according to Can & Hou (2020)'s study, they only constituted 11% of the total research output in IHE within the period 2013-2018. Comparing to their counterparts in East Asia, countries in SEA were having an even smaller share of contributions to the field of IHE or as Kuzhabekova et al. (2015) referred to as having less intensive activity in research production on this topic. Therefore, understanding the current landscape of IHE among SEA countries is important for stimulating the knowledge production on IHE within SEA for the academia by recognizing the themes that need further contributions.

IHE in SEA Contexts

Ever since its establishment in 1967, the Association of Southeast Asian Nations (ASEAN) has been a regional representative body for SEA countries and the 10 member states are forming a clearer boundary for the area that is considered as SEA. Within this context, HEIs have been adopting strategies in internationalization that are in echo with those implemented worldwide. As early as the 2000s, countries in SEA had already become significant exporters and importers for international students and were organizing joint programs and degrees with HEIs from Australia, Europe and even Japan as a way to import scientific knowledge from the developed world and keep up with the international trends (Altbach & Teichler, 2001; Mok, 2007; UNESCO, 2006). In the 2010s, countries such as Malaysia and Singapore were further expanding their efforts in internationalization into national levels as they were signing agreements with other countries to facilitate student exchange and cooperation in teaching and learning, with the overarching goal of positioning themselves as regional education hubs (Cheung et al., 2016; de Wit et al., 2015). The rising importance of IHE in SEA also attracted the involvement of various actors such as the World Bank, UNESCO and WTO, as they contributed to policy making in the region (Chao, 2016). The continuous efforts from HEIs, governments and inter-governmental organizations across SEA in internationalization, together with an increasing demand and research capacity as mentioned above, have created a greater need for empirical evidence that can fuel further research (Cheng et al., 2016; de Wit et al., 2015). Nonetheless, most existing literature with the themes of IHE

within SEA have confined their scope on particular countries, notably Malaysia and Singapore, or borrowed the experiences from Western countries without giving enough considerations of the Asian contexts (Andersson & Mayer, 2014; Cheung et al., 2016; Knight & Morshidi, 2011; Lau & Lin, 2016). As Mok (2007) argued, the unique characteristics and cultures in Asia should call for scholars in developing their own paradigms for directing and understanding IHE. This broader vision will require the support from the academia in making more in-depth analysis on collected empirical evidence about IHE within SEA, which are still in paucity (Rumbley, Altbach & Reisberg, 2012; Phuong et al., 2015).

Methodology

In order to analyse the effort that the academia has put into the discussion of IHE in SEA, systematic literature review was adopted as the research method in this project. As suggested by scholars, systematic literature review allows researchers to grasp a comprehensive picture about what they already knew and had not known yet, and hence helps identify the areas that required further studies on (El Alfy et al., 2019; Mertens, 2005; Newman & Gough, 2020). Back in the 2000s, when IHE was beginning to attract attention within the higher education sector, Teichler (2003) had advised researchers to be "future-conscious" in order to accommodate newer ideas that the public might raise (p.181). Systematically reviewing literature on IHE in SEA is embracing and fueling this future-consciousness for researchers as it helps identify themes that need more contributions from the academia as a preparation for the looming issues facing the field in the future. This is also a response to the recommendations made by other researchers who had made contributions in reviewing higher education research publications in which more reviews on under-researched topics including internationalization and literature about higher education with the focus on SEA were encouraged in order to facilitate the development of higher education sector in the region (Phuong et al., 2015; Tight, 2019).

Data Collection

This research project followed the four phases of data collection in systematic reviews proposed by Moher et al. (2009), namely identification, screening, eligibility and included. Similar strategies which saw researchers conducting data synthesis on data collected from online databases after rounds of screening and selection based on certain exclusion criteria were also observed in other research studies that used systematic literature reviews on investigating issues related to higher education development (Al-Kurdi et al., 2018; El Alfy et al., 2019; Manatos et al., 2017; Phuong et al., 2015; Roth et al., 2016; Vlachopoulos & Makri, 2017). For this research, Education Resources Information Centre (ERIC, EBSCOhost) was selected as the online database for searching literature because firstly, as one of the most widely used databases in education, it provides a comprehensive coverage of accessible educational literature (Phuong et al., 2015). Secondly, its links feature and improvements in controlled vocabulary searching facilitate researchers in accessing full-text items based on a search using a thesaurus of key terms which in the case of this research is essential (Othman & Sahlawaty Halim, 2004; Vinson & Welsh, 2014).

Based on the key components of IHE summarized in the previous section, the following terms were employed for the initial search in which all searchable fields were covered:

1. internationalization OR student movement OR student mobility OR academic staff movement OR academic staff mobility OR cross-border programs OR cross-border institutions OR branch campus
   AND
2. higher education OR post-secondary education OR higher education institutes OR post-secondary education institutes
   AND
3. Brunei OR Cambodia OR Indonesia OR Laos OR Malaysia OR Burma OR Myanmar OR Philippines OR Singapore OR Thailand OR Vietnam

Five extra selection criteria were also applied in the initial search, namely peer-reviewed, full text, English language, academic journal and within the time period from 2007 to 2020. It was confined to this period because in 2007, the ASEAN Charter which recognized ASEAN University Network (AUN) as one of the agencies in ASEAN socio-cultural community was signed by all 10 member states, and

thus regional effort in higher education development had begun to be organized within official structure (ASEAN, 2008; AUN, 2012). Truncation was not used in the initial search as the default thesaurus to searches offered by EBSCOhost already covered different forms, tenses or spelling alternates of a word (EBSCO, 2018).

As illustrated in Figure 1, 9,494 publications were identified in the initial search conducted on 2nd February 2021. These publications were then screened in phase two according to the thematic and geographical focuses reflected in either the title or the abstract. Some of the publications screened in this phase were having the thematic focus on IHE, but without a specific geographical focus. These publications were still included as their full texts needed to be further examined in the next phase in order to determine whether they were relevant to the research focus or not. During this phase, 9,174 publications were excluded based on irrelevance or inaccessibility to their full texts. In phase three, 320 selected publications were examined according to their full texts so as to see whether they were first, geographically focused on countries in SEA and second, thematically centred on the three components of IHE (student/academic staff movement, cross border programs/campuses, national/regional cooperation) and third, able to provide answers to the four research questions. There were some publications that mentioned the experiences of countries in SEA while addressing broader issues about IHE, but they were either cited briefly as one of the examples or the main objectives of the articles were directed towards countries outside of SEA. In order to explore findings specifically on IHE within SEA, these publications were not included. Eventually, 264 publications were excluded and the rest of them (56 that were fit for analysis) were included to be further analysed in the data synthesis stage.

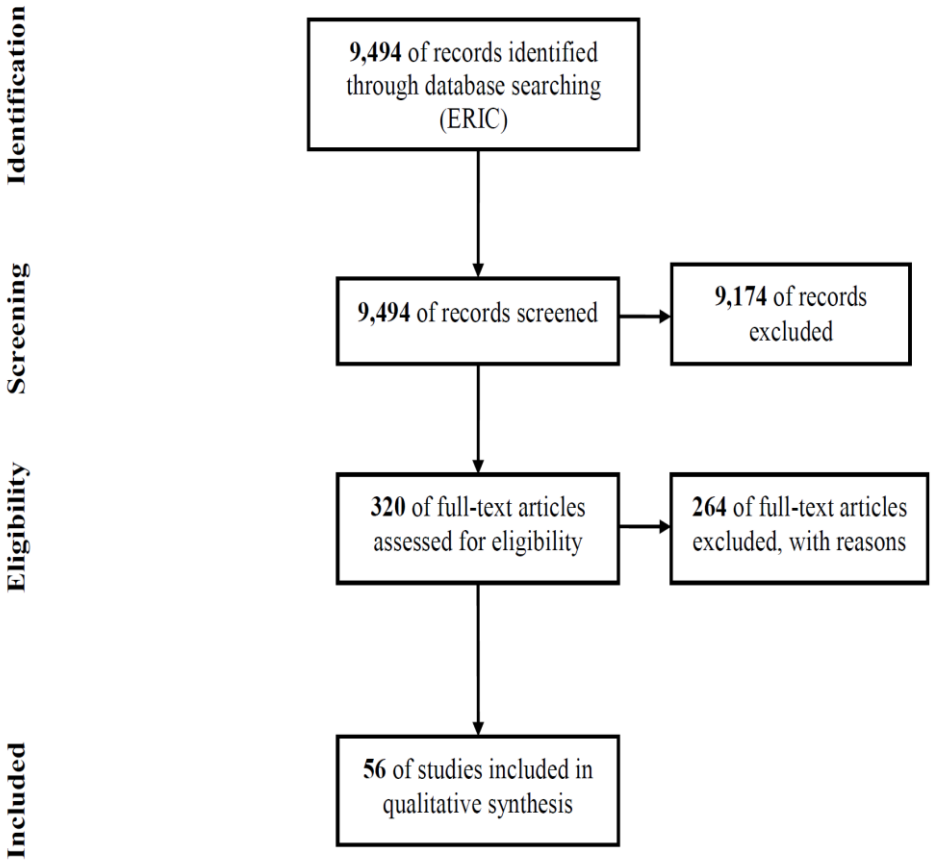

Figure 1. Four phases of data collection (adapted from Moher et al. 2009)

Data Synthesis

In this stage, the data collected was qualitatively analysed by adopting the strategy being described as "mapping" (Newman & Gough, 2020, p.16). The full texts of the selected publications were examined

in details to provide answers for the four research questions this project sets out to address. The answers to each question were gathered and presented in the forms of figures and tables which depicted the scope of coverage of existing literature on IHE within SEA. With this, researchers can be informed of the areas about IHE in SEA on which are calling for further studies.

Concerns over Validity

The validity of systematic literature review rests on the transparency of the research process being presented. However, according to Hammersley (2020), having total transparency in the review process was an "unattainable ideal" in systematic review (p.30). Therefore, a more pragmatic way to settle concerns over validity in this research project is to present all the specific procedures of the research as presented in the above sections in order to be as transparent as possible for audience to follow the research process as closely and detailed as possible, which, as reiterated by Papaioannou et al. (2010), should be regarded as the requirement for systematic review.

As the sole researcher in this project, it is observed through reflections that subjectivity was a significant factor influencing the objectivity of the research, especially during the literature screening process which lasted for over a month given the many publications identified. From the experience in this research, in order to maintain the objectivity during the screening process and not to miss out any publications for data synthesis, researchers should always refer back to the criteria for selection and screen ambiguous publications more than once if needed.

Results

The design for the first research question (Which country(s)/which author(s) produced the most literature on IHE within SEA?) is meant to help locate the sources of literature on IHE within SEA based on their authors and countries of publishing. From the analysis, the selected publications were written by different scholars coming from a wide range of background and no particular authors were identified for producing literature on IHE within SEA in a consistent way. There were only a handful of authors who published or co-published at most two articles on this topic. Thus, no significant findings could be drawn concerning the authors who produced the most literature on IHE within SEA.

The countries of publishing were categorized into SEA countries and non-SEA countries since there was duplication as some literature were co-published by authors coming from institutes located in different countries. As reflected in Figure 2, Malaysia is the SEA country that published the most literature on IHE within SEA (15), exceeding the number of publications from Thailand (7) and Vietnam (5) combined (second and third place). Other SEA countries who have a low level of publication contributions to the literature on IHE within SEA are Indonesia (4), Singapore (3), the Philippines (2), Cambodia (1) and Laos (1).

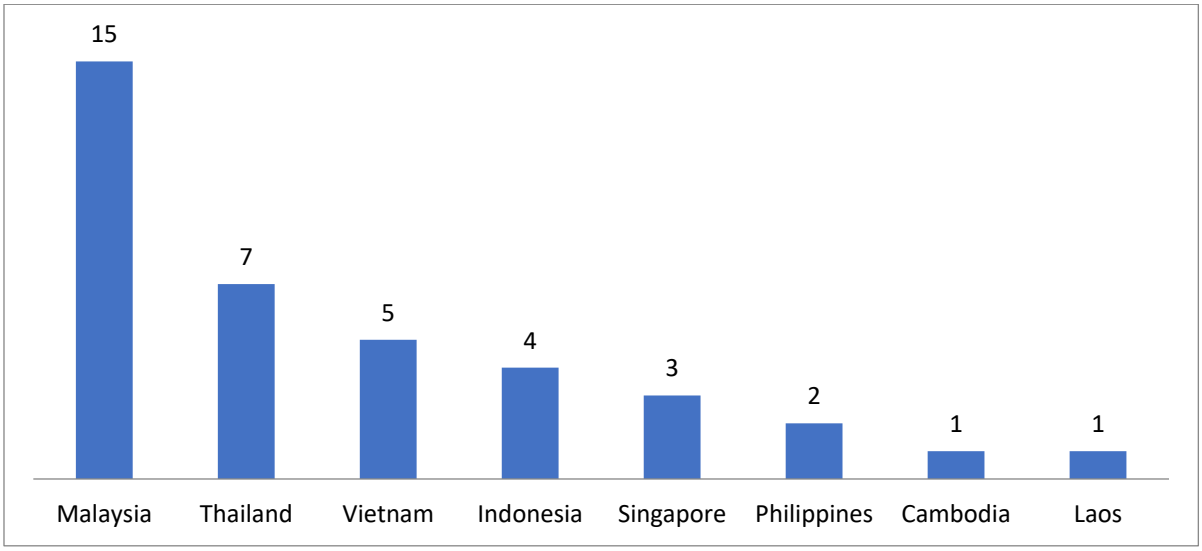

Figure 2. Number of publications on IHE within SEA published by SEA countries

As for non-SEA countries, as observed in Figure 3, Australia is the country that published the most literature on the topic (17), far exceeding other countries including the USA (5), Canada (4), UAE (2) and some other countries including Bangladesh, Belgium, Japan, New Zealand, Pakistan, UK and the UNESCO (1 each).

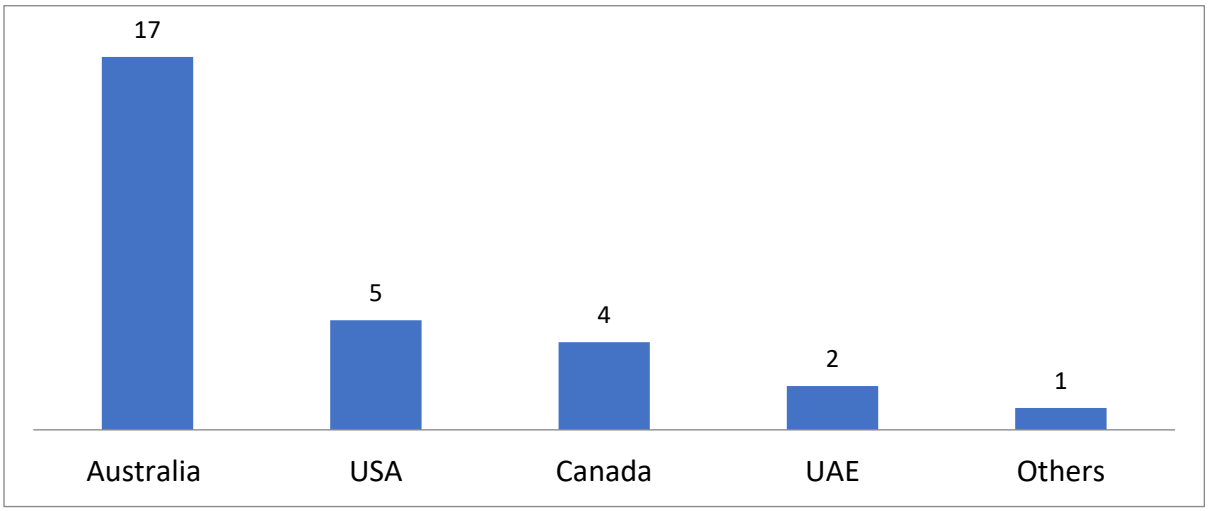

Figure 3. Number of publications on IHE within SEA published by non-SEA countries

Regarding the second research question (Which country(s) is/are targeted for research in the literature on IHE within SEA?), the analysis revealed that almost all of them are countries within SEA whereas certain non-SEA countries are also being targeted in a handful of literature. As shown in Figure 4, Malaysia is the most targeted country as it appeared in 23 publications, followed by Thailand (11), Vietnam (11), Indonesia (6), Singapore (5), the Philippines (5), Cambodia (3), Laos (1) and Myanmar (1). Four of the publications took a broader and more institutional perspective and targeted at ASEAN in addressing IHE within SEA. Other non-SEA countries that are also being targeted at in the analysed literature are Hong Kong (2), Australia (1) and China (1).

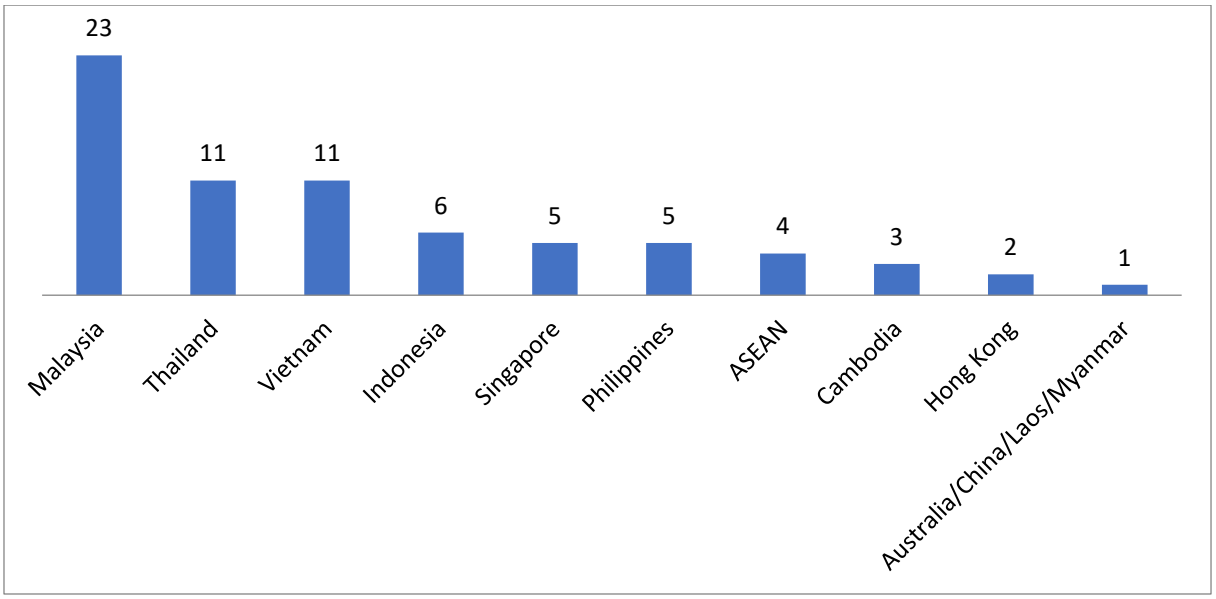

Figure 4. Frequency of countries as the targets for studies in publications on IHE within SEA

For the third research question (What are the research methods adopted in the literature on IHE within SEA?), the majority of them were qualitative in nature. As illustrated in Table 1, 38 publications adopted qualitative methods while quantitative methods and mixed methods were only used in 10 publications and 8 publications respectively. Some of the common research methods employed in these publications

include interview and document and data analysis for qualitative research, questionnaire and survey for quantitative research, as well as interview, questionnaire and survey for mixed method research.

Table 1. Frequency of research methods adopted in publications on IHE within SEA

Research methods	Frequency
Qualitative	38
Quantitative	10
Mixed method	8

For the last research question (What are the common themes covered by the literature on IHE within SEA?), the thematic focuses of the selected publications are classified into seven categories in accordance with the key components of IHE summarized in the previous section. The results of the analysis are summarized and shown in Figure 5 below. As reflected in Figure 5, the most popular topic on IHE within SEA is about the learning experience of international students in SEA countries (17), followed by internationalization policies from either the government's perspective or HEIs' perspective (12), transnational HEIs collaboration (9), regional collaboration in education (both higher education and education in general) within SEA (8) and learning experience of SEA students in overseas HEIs (8). Two other thematic focuses that are drawing less attention but are still being covered among literature on IHE within SEA are experience of academics (either foreign academics working in SEA or SEA academics working in overseas HEIs) (4) and international branch campuses in SEA (4).

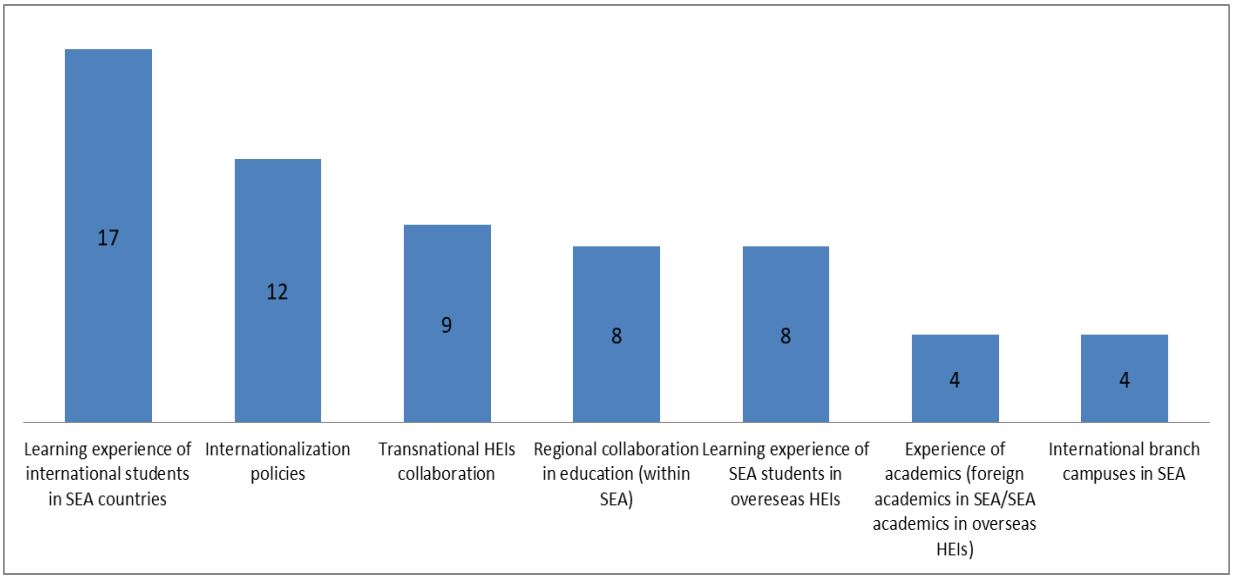

Figure 5. Frequency of thematic focuses in publications on IHE within SEA

Discussion and Conclusion

The findings reported above lead to four observations. Firstly, Malaysia is considered as the main driver behind the trend of IHE within SEA. Malaysia is the country in SEA with the most publications on IHE in the region and it is also the country being targeted at the most by literature on IHE within SEA. As explained in Tham's (2013) article, Malaysia began to explore the possibility of improving its human capital by encouraging the development of private education institutes and increasing collaboration with foreign HEIs as early as 1991. Later in 2004, as different contextual factors bred a growing interest in higher education research, the Malaysian government founded the Ministry of Higher Education which spearheaded a number of reforms in higher education (Azman & Sirat, 2018). By pouring in economic investment and providing motivations through favourable policies, higher education development in Malaysia was able to bear fruits over the years as it has become a regional student hub with a growing number of international students and an attractive site for foreign universities to establish their branch campuses (Aziz & Abdullah, 2014). With such a huge influence on education development in SEA, the experience of IHE in Malaysia has drawn the attention of different scholars as reflected by the research findings.

Secondly, apart from Malaysia, other countries in the region are making contributions to the topic in proportion to their respective progress in IHE. Among them, Thailand and Vietnam stand out to be garnering more interests from the academia to study their experiences. For Thailand, the process of IHE began as early as 1990 when the government was motivated by economic motives to push for it. In 2009, Thailand made clear its vision of becoming an educational hub in the region and since then, had implemented various initiatives such as "Thailand 4.0" with the aims of increasing investment on universities to increase their international rankings and ultimately, develop into a knowledge-based economy (Lavankura, 2013; Prompilai, 2018). For Vietnam, intentional effort on IHE started in 2005 when the government encouraged Vietnamese students to study overseas and advocated strategies that attracted foreign HEIs to set up branch campuses in Vietnam which could benefit local HEIs in their internationalization development and help establish global networks in higher education development (Harman et al., 2010; Welch, 2010). The efforts that both Thailand and Vietnam put in IHE were displayed by their higher frequency of publishing relevant literature on the topic and being the targets for studies by literature comparing to other countries in the region.

As for Indonesia, Singapore and the Philippines, they are also offering data on their experiences in different themes of IHE. In Indonesia and the Philippines, a set of contextual push and pull factors accelerated the process of IHE since the 2000s, but issues such as unsatisfactory quality of teaching and lack of support in the broader institutional level confined the scale of internationalization compared to other countries in the region (Albia & Chan, 2017; Idrus, 1999; Wicaksono & Friawan, 2011). For Singapore, reforms in higher education which promoted internationalization were carried out in the late 1990s as a response to the growing trend of globalization (Mok & Lee, 2003). Since then, the Singaporean government had implemented various strategies in internationalizing curriculum, encouraging student mobility and even put forth the "Global Schoolhouse" initiative to develop itself into a regional educational hub and enjoy the economic benefits that came with it (Daquila, 2013; Lee, 2018). Surprisingly, despite all these efforts and having a relatively well-established and reputable higher education sector in the region, not a lot of synthesized publications are produced by or targeting at Singapore. The experience of Singapore in promoting IHE and its lack of publication on this topic might be an interesting area for researchers to study more on in order to draw up a more in-depth explanation.

Thirdly, findings revealed the importance of Australia as a partner with SEA countries in promoting higher education development in the region, as it did not only publish the most literature on IHE within SEA among non-SEA countries, but also published more literature than Malaysia or any other SEA countries. The close partnership between Australia and SEA in higher education development can be traced back to 1950 when the Colombo Plan was initiated by Commonwealth countries with the objective of enhancing social and economic development in SEA in order that the spread of communism in the region could be contained (Auletta, 2000). Not only had the Colombo Plan paved the way for the convergence of Australia and SEA countries to be a regional force, but also rendered Australia an attractive location for SEA students to pursue higher education (Oakman, 2000). According to Weiss & Ford (2011), Malaysia, Singapore and Indonesia accounted for the majority of SEA students enrolled in Australian HEIs and hence, they became a "core component" of Australian international education (p. 235). Since 1974, when Australia became the first dialogue partner for ASEAN, the two have also been engaging in bilateral cooperation in a wide range of areas, including trading, security and most importantly, education (Department of Foreign Affairs and Trade, 2021). Then in 2014, the Australian government launched the New Colombo Plan which intended to deepen engagement with the Indo-Pacific region by sending Australian students to pursue higher education in the region, with Singapore and Indonesia among the earliest suggested destinations (Byrne, 2016; Lowe, 2015). As revealed by Tran & Vu (2018)'s studies on the experience of Australian students in Asia, this new plan of reversing student mobility helped Australian students to be more "Asia-aware" and accumulate capital essential for their future engagement in the region (p. 204). In short, as suggested by Welch (2016), the desire for ASEAN member states to keep improving their higher education sector, increasing interests for SEA students to pursue higher education in Australia, and the expansion of ASEAN migrant communities in Australia all helped create favourable conditions for Australia and ASEAN to continue and deepen their

cooperation in higher education development up till now. Thus, Australia has become an indispensable partner with SEA in IHE, which justified the research findings.

Fourthly, regarding the themes of interests in IHE within SEA, the analysis of the selected literature showed that the majority of their thematic focuses are either on "learning experience of international students in SEA" or "IHE policies". While learning experience is a broad idea that embraces various aspects of students' learning, some of the examples of study focus are "academic adjustment issues for ASEAN postgraduate students in Malaysia", "quality learning environment for international students in Malaysia" and "perceptions of service quality for international business students in Thailand". For IHE policies, researchers were interested in both the government's and HEIs' perspectives, as examples of study focus include "IHE policies initiated by governments in Malaysia, Singapore and Hong Kong" and "IHE strategies in an Indonesian/a Filipino university". As a whole, despite the difference in specific topics and study focuses, the themes in IHE within SEA that have drawn the most interest and contributions from the academia are the learning experience of international students in the region and policies on IHE. Based on the research findings, the areas that need more contributions from researchers can be summarized as the followings:

Firstly, there is a lack of information about some SEA countries. Out of the 10 ASEAN member states, only five of them (Malaysia, Thailand, Vietnam, Singapore and Indonesia) have consistent publications on IHE in the region and based on the research data on their IHE experiences, researchers and policymakers are able to understand the higher education development in these countries. The Philippines was publishing literature in a limited amount, but together with a small number of publications targeting at IHE in the Philippines, we can still have a glimpse of the situation there. For other ASEAN countries, namely Brunei, Cambodia, Laos, Myanmar, there are not much research evidence on their experiences in IHE.

In fact, these countries had made their effort in IHE, but due to different limitations, their experiences are not sufficiently disclosed and shared with the rest of the world. In Brunei, HEIs such as the Universiti Brunei Darussalam (UBD) have put in place various internationalization policies that are bearing some fruits, but there is a lack of research in analysing their experiences (Tibok & Hiew, 2020). For the adjoining countries of Cambodia, Laos and Myanmar, Hill et al. (2021) identified barriers such as funding, lack of concrete strategies, language barriers and institutional issues which hindered the progress of IHE despite the governments' intentions to promote it. In order to facilitate IHE within SEA, more data from these less-studied ASEAN countries in IHE or higher education development in general need to be extracted. Only then can researchers have more in-depth understanding of the situations in these countries and conduct further analysis to diagnose the progress of IHE there.

Secondly, comparative analyses are rarely seen among the screened literature. The majority of the selected literature on IHE within SEA concerned the experience in one country only, with a small number of them citing experiences from multiple countries as case studies. While understanding more about the work on IHE of each of the 10 SEA countries is essential for grasping a full picture of IHE in the region, more comparative analysis of SEA countries can offer another dimension in diagnosing the progress of IHE in the region. As echoed by scholars, comparative analysis on IHE in various countries was much more time-and-resources-consuming which rendered a general scarcity of materials in this nature (Kehm & Teichler, 2007; Teichler, 2017). In order to yield new discoveries on IHE within SEA, researchers may consider conducting more comparative analysis between SEA countries.

Lastly, the above findings identified a number of topics on IHE within SEA that need researchers to pay more attention to. First, more studies focusing solely on the mobility of both students and academic staff in the region are needed. As highlighted by Teichler (2017), the number of mobile students was the most frequently used indicator to reflect the progress of internationalization. However, among the literature on IHE within SEA, not much attention had been paid to analyse the mobility of students in the region, needless to say the mobility of academic staff. Offering concrete data and the corresponding quantitative analysis can produce resources that are helpful for gauging the progress of IHE across SEA.

Second, more work must be done on exploring the experiences of academic staff in IHE in SEA. Out of the analysed literature, although four of them were about experiences of academics, including both international academics working in SEA and SEA academics working overseas, studies on academics were receiving much less attention than the experiences of students. In fact, the difficulty to define what constitutes international academics was argued as the main reason behind the under-explored issue of academic staff mobility (de Wit & Altbach, 2021). Despite the hurdle in coining a definition, researchers need to produce more findings on not only the mobility of academics in SEA, but also their experiences in IHE in general in order to visualize a more complete picture of IHE within the region.

Third, there is a lack of contributions on governments' or HEI's efforts in IHE at home. As scholars pointed out, national or institutional policies that aim at promoting internationalization at home such as internationalizing curriculum and the cultivation of global citizenship were receiving growing interest as a crucial component of IHE (de Wit & Altbach, 2021; Kehm & Teichler, 2007). Nonetheless, among the 12 publications analysed that had a study focus on IHE policies, only one of them mentioned internationalization at home which targeted at HEIs in Vietnam. While almost all researchers had been outward-looking in studying IHE within SEA, it might be worth spending more effort in looking inward to explore new findings from the work of IHE at home.

Fourth, researchers should look more into the roles of e-learning/online learning in the process of IHE within SEA. As mentioned earlier, future-consciousness of researchers is essential to prepare for what's coming in the future. In his article, Teichler (2017) also reiterated that "virtual border-crossing" was becoming a popular trend which would be drawing more researchers in the field to reflect on related issues (p.209). Together with the outbreak of COVID-19, virtual learning will likely be a central component to IHE going forward and hence, researchers interested in IHE within SEA should expand the scope of focus and put more effort into studying this area.

Limitations and Recommendations for Future Studies

There are a couple limitations for this research that are worth mentioning. First, the data analysis in this research did not cover the academic journals in which the literature on IHE within SEA were published. As an analysis on that can be helpful in illustrating the dynamics of research communities that are interested in IHE within SEA, it may go beyond the objective of this study (i.e., to map out the thematic landscape of existing publications on IHE within SEA) and is able to produce information rich enough for analysis in a separate study. Second, there is a lack of specific suggestions on policymaking for education institutes or authorities within SEA on IHE. By identifying general observations about academic contributions on IHE within SEA, this research can offer directions for scholars in conducting future studies, but not much concrete suggestion on policy-practice for various actors involved in the process of IHE.

Apart from the suggestions made in the previous section, scholars are recommended to consider the followings as they are set to contribute further on this topic. First of all, analysis focusing on the academic journals that publish articles on IHE within SEA is encouraged as it might reveal information on the relationships amongst research communities interested in SEA or based in SEA. This information can complement the findings in this research to deduce more observations on higher education development in the region in. Moreover, scholars can focus on the practice of specific institutes or governments in IHE within SEA in order to draw on their experiences and produce more policy-oriented analysis which can be instrumental in supporting other institutes or governments in further promoting IHE.

Acknowledgement

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Micro-credentials, Higher Education and Career Development: Perspectives of University Students

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Abstract

Emergence of micro-credentials, digital qualifications less than a degree, is rooted in an increased demand for quality and digitalized higher education, and a growing demand for skilled human capital tailored for the industry. There is now a wider acceptance of micro-credentials by the industry as proof of necessary skills set developed by employees, either as a supplement or an alternative pathway to traditional college diplomas. However, within the context of higher education, an enlarging ecosystem of micro-credentials is also raising concerns over the potential of micro-credentials in career development. This phenomenological study projects an in-depth understanding of the phenomenon of micro-credentials within the context of higher education by involving experiences and interpretations of key participants- university students. Participants involved 11 junior and senior students enrolled in an advanced communication skills course focused on preparing students for their careers. Data was collected using semi-structured interviews, and they were analysed using content analysis technique and MAXQDA software. The findings show that the employability and accessibility factors enable participants to adopt micro-credentials more in their career development. Additionally, participants' belief that the university education is being more theoretical or fragmented, and the changing mindset of the participants towards higher education after the COVID-19 pandemic also facilitate the adoption of micro-credentials in building their careers. Participants are also deterred from embracing micro-credentials in their career pathways. This is due to participants' discontent with the dominance of data science or computer engineering fields, perceived low prestige attributed to micro-credentials, and reservations about any possible prejudice against micro-credential holders. Another finding is that participants seem to perceive micro-credentials more as a supplement to traditional university degrees rather than an alternative pathway to career development. Finally, participants frequently related their adaptive career behaviour (using micro-credentials to advance in career) to setting specific career goals and enacting them with persistence. An additional finding is that participants' display of this adaptive career behaviour is also contingent upon the personality traits of being entrepreneurial, conscientious, and extraverted. The findings have been discussed in the light of the existing literature on micro-credentials, higher education and the career self-management model, and some implications have been provided.

Keywords: Micro-credentials, higher education, career development, social cognitive career theory, career self-management model

Introduction

A micro-credential (MC), in its simplest form, "is a certification of assessed learning that is less than a formal qualification" (Oliver, 2019, p. 19). A micro credential may include skills or competency in the form of "'nano-degrees,' 'micro-masters credentials,' 'certificates,' 'badges,' 'ratings', 'licenses', 'endorsements,' or 'memberships'" (Milligan & Kennedy, 2017, p. 43). While obtaining MCs, learners complete shorter bits of learning and earn certification as compared to traditional college level diplomas (Chakroun et al., 2018; Wheelahan & Moodie, 2021). In other words, learners that aim to obtain MCs enrol in, complete, and earn certification of shorter modules of industry-oriented subject matter; these credentials may also bear credits towards a conventional higher education (HE) degree (Resei et al., 2019).

Emergence of MCs or short-term digital qualifications owes much to three mega trends: high demand for quality university education in developing countries, digitalization of the industry, and digitalization

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of HE sector according to Simon Nelson, the CEO of a leading global provider of micro credentials (as cited in Horton, 2020). Similarly, Gallagher (2018) highlights the growing need for technological demands and skills gap in the workplace in that employers today value on-the-job learning and educational programs that relate to the demands of the businesses; thus, they can verify and benefit the skills and competency of their employees. Such pressures on higher education institutions (HEIs) were mostly responded until recently by the inauguration of distance learning, hybrid classes in HEIs, and partnerships with global providers of online content at tertiary level. However, the fast-paced growth of MOOCs-massive open online courses- by universities during the past decade were soon challenged by private companies' platforms such as Coursera, edX etc. These global providers now operate in ways that they offer short-term courses as well as degrees. HEIs have now also started to close on-campus programs to offer degrees online as a result of partnerships with global providers. One example to this university-micro credential provider cooperation is the on-campus residential MBA program of the University of Illinois, Urbana-Champaign (Oliver, 2019). Oliver also affirms a MC ecosystem in which social sciences contents such as leadership and management also count as micro credentials; this shows that social sciences are also part of this phenomenon in addition to commonly cited micro credentials in natural sciences and information technologies.

Gallagher (2018) also suggests that the growing trend of more learners turning to online credentials is now more visible among human resources managers, with 61% holding the idea that online credentials are equally of quality compared to those obtained in physical settings. This finding is further supported in today's businesses; leading actors in private sector now even go one step further to bypass HEIs, and sometimes cooperate with global MC providers or use their own in-built training centres to offer certificates. One example is Google (Google, 2020); Google's career certificates have recently been announced to be equivalent to college degrees as these career certificates will be used to fill entry-level positions in Google that require a college degree. According to Fain (2018), previously Google also started working with a network of other companies that agreed to employ holders of Google certificates.

Literature review

The industry has posed challenges to HEIs by voicing the growing need for a tech-savvy and skilled work force that can meet the instant demand and cloze the skills gap in the workplace. These challenges posed to HEIs by the industry have now been coupled with COVID-19 measures that led the way to a non-programmed strategic decision by HEIs to initiate distance education and to offer all classes online in the past few years. As Wheelahan and Moodie (2021) put it, MCs had growing popularity even before the Covid-19 pandemic. However, due to the pandemic they have gained more ground among people who were unemployed after the pandemic started. The pandemic also hit student enrolments, especially international students who were barred from travelling to their universities. As European Commission (2020) notes, the pandemic motivated more learners to boost their skills set through MCs, and better prepared them for a post-pandemic labour market. If COVID-19 measures continue or the world witness outbreaks of other pandemics, will that downgrade universities to providers of online tertiary education like other global platforms that offer MCs? Will this dilemma uplift global platforms and providers of MCs? Will MCs be a supplement to traditional HE as foreseen by Oliver (2019) and Resei et al. (2019) or an alternative pathway to success in career? Fong et al. (2016) add to this discussion with the role that they believe alternative credentials play in HE; courses taken in non-traditional settings and programs that offer MCs have gained momentum and are becoming mainstream among HEIs.

Regarding the intersection of university and the industry, how much intervention into HE is acceptable given the growing human capital needs of the industry? MCs are believed to promise an even more 'tailored' league of graduates for the industry. The Organization for Economic Cooperation and Development (OECD, 2019) also projects some mega trends in education around the idea of complex and fast pace of change that is taking place. To OECD, future education needs to be ready for socio-economic and technological changes; this change affecting education extends into in formal and informal learning environments, and entails taking a different perspective to how and what is taught. To Oliver (2019), similarly, societies and economies in the twentieth century valued formal qualifications and certified learning; however, those in the twenty-first century have become more demanding as to work, life and citizenship, thereby necessitating novel educational systems.

Thus, an evolved twenty-first century educational model may offer a blend of formal and non-formal learning in which MCs align with the non-formal education side of the continuum. Accordingly, learners in the twenty-first century tend to take control of their own learning. Through upskilling and reskilling offered by MCs, learners make more informed and proactive decisions about their careers. As suggested by Social Cognitive Career Theory (SCCT), the career self-management model guides learners to engage in career related behaviours to develop their careers and eventually achieve their specific career goals. These career-oriented behaviours are termed adaptive career behaviours (Lent & Brown, 2013). In their model, Lent and Brown suggest that learners' display of adaptive career behaviours is influenced by cognitive-person factors, and contextual and personality factors. Specifically, learners exercise adaptive career behaviours such as exploring career options or engaging in job search under the influence of their:

- self-efficacy beliefs (personal beliefs about one's ability to display particular career behaviours)
- outcome expectations (personal beliefs about a positive career outcome after displaying a particular career behaviour)
- goals and actions (specifically stated career related goals that facilitate career behaviours)
- contextual factors (environmental support with minimal barriers) and personality traits (such as being conscientious, extraverted, openness to experience etc.).

Regarding SCCT, in simplest terms, participants' adaptive career behaviour is explored in this study. This adaptive career behaviour can be interpreted within the context of MCs as follows: Participants decide to engage in using MCs as a career exploratory and decision-making behaviour. During career exploration, participants possess favourable beliefs regarding the use of MCs in their career development; they expect positive outcomes that result from their engagement in their efforts to use MCs to build a desirable career; they set specific goals to engage in this adaptive career behaviour; they have a supporting environment and minimum barriers to succeed in building their careers based on MCs; they also have personal characteristics fitting with the use of MCs in their career paths.

Previous research

Previous studies on MCs and their potential implications on HE used surveys that lacked the depth of qualitative insight into MCs as in Gallagher (2018) who aimed to understand the prospect of credentials and how they translate to work settings. Fong et al. (2016) explored the current marketplace for alternative credentials with a survey and concluded that they are becoming an indispensable part of income for HEIs, and that they are vital for the success of these institutions in the years to come. Some researchers used multiple units of analysis in qualitative nature as in Resei et al. (2019) who interviewed key informants in the MC ecosystem (HEIs, MOOC platforms, and companies) with the goal to depict the current landscape of MOOC-based MCs in the EU and around the globe. They concluded that MCs are quite promising regarding the benefits companies, learners and universities may enjoy; however, there is still ambiguity over micro credentials especially in Europe; they also stated that micro credentials are still viewed as complimentary to HE rather than alternative pathways to certified formal education.

Other studies used qualitative data collection techniques as in Carey and Stefaniak (2018) who interviewed with 11 key informants who manage digital badge projects within HE system. They found that skill-based badges were prioritized over participation badges. Similarly, Ghasia et al. (2019) used interviews with faculty and students to delve into teachers' perception of MCs as well as to grasp student perspectives. They found that both participant categories were optimistic as they thought MCs would boost learning and challenge university's authority. Others have used multiple-case studies or mixed-method research. Stefaniak and Carey (2019) conducted a multiple-case study of faculty and students from three universities to demonstrate the challenges and solutions in the implementation of badges. They concluded that complexity was a barrier to implementation; usability, workload on faculty, and insight issues needed to be worked on. In another multiple case study design, Cheng et al. (2020) aimed to understand students' use of digital badges to help with their goal setting. They found that digital badges facilitate self-regulated learning in HE settings. Dyjur and Linsdstrom (2017) used a mixed method design, a survey and interviews, to measure the perceptions of students and prospective uses of

digital badges. They found that students viewed digital badges authentic and innovative. However, some viewed them as less prestigious than formal certification.

Research on career self-management model in connection to MCs is even scarcer. Healy (2021), in a theoretical commentary, argues that learners are aware of the employability aspect of MCs and also they have the will to control their own career paths; still, learners need guidance to integrate MCs into their job search or career building activities so that they can communicate their skills and qualifications better to the job market. In a more concentrated and empirical work, Wendling and Sagas (2020) examined college athletes' career planning after quitting active sports life by using career self-management model of SCCT in a Structural Equation Modelling design with 538 respondents. Among the variables they tested were career decision self-efficacy, career goals, perceived career planning support from coaches, perceived career planning barriers, and some personality factors. They reported significant direct, indirect, and moderating relationships of the cognitive, contextual, and personality variables on career planning; and also implications of cognitive factors, contextual factors and personality factors on career planning were discussed. In another set of studies, Lent et al. (2016) earlier provided an application of career self-management model of SCCT on 180 undergraduate college students regarding their career exploration and decision-making behaviours; their study validated the career self-management model with the addition of decisional self-efficacy.

Significance

Oliver (2019) points to the scarce research on micro credentials or its derivatives, and stresses the ambiguity over micro credentials on behalf of the learners, the target consumers, or the employees. This research study projects an in-depth understanding of the phenomenon of MCs within the context of HE by involving experiences and interpretations of key participants (university students) during their career development initiatives. This research also joins MCs framework and career self-management model in SCCT. This makes it a unique design; as a result, this research study is likely to give a more focused and original picture of MCs regarding career development of tertiary level students. Moreover, MCs is a growing phenomenon in the USA; although there is available research from the USA (Gallagher, 2018), Europe-in comparison to the US and other countries (Goglio, 2019; Resei et al., 2019) and Australia (Milligan & Kennedy, 2017; Oliver, 2019), there is even scarce research in the periphery of these locations like Turkey where unique conclusions regarding the field of HE can be drawn as students with diverse backgrounds enrol in MCs in their career development ventures, and still target the skills sets required by the companies in the USA.

The main research question is:
How do university students, one of the main stakeholders of micro-credentials, view micro-credentials within the context of higher education?

Sub-research questions:
-What are the facilitating factors and barriers of MCs in terms of career development?
-To what extent do university students see MCs as a supplement or an alternative pathway to conventional university degrees?

Method

This research study is designed as a phenomenological study, one of the qualitative research methods. In phenomenology, while researching various responses or perceptions to a particular phenomenon, the researcher aims to get an idea of the world of its participants and to define their perceptions and reactions; the researcher tries to describe and explain in detail the characteristics of each participant's perceptions and reactions regarding their own experience (Fraenkel et al., 2012). In this study, the aim is to understand how key participants from main stakeholders (university students) perceive MCs, and to describe how their interpretations may help better understand the implications MCs may have on HE and career development.

Participant characteristics and sampling

As Fraenkel et al., (2012) explain, in the purposive sampling procedure, participants who have knowledge and experience about the phenomenon being studied are determined by the researchers, and these selected participants are included in the sample. Accordingly, while determining the participants in this study, the purposive sampling method was used; for this purpose, participants who are informed about or have experience with MCs were selected. The most lucrative setting to recruit the most engaged and diverse participants for the study would be a career related course. To this end, the participant group was formed from junior (3rd graders) and senior (4th graders) undergraduate students who are currently enrolled in an undergraduate must course focused on advanced communication skills for career preparation (This course itself is not a micro-credential offered to the participants.) at an international research-intense university in Turkey with English-medium instruction and a high ranking in international rankings. Participants come from a variety of countries and backgrounds. All participants have either completed some form of internship related to their majors earlier or are planning to apply for internship soon. Senior participants are actively looking for a job. Most participants have obtained a form of MCs or are planning to do so soon.

Table 1. Participants in the study

	Nationality	**Gender**	**Age**	**Grade**	**Major Field**
Participant 1 (PT1)	Lebanese	Male	20	Senior	Mechanical Eng.
Participant 2 (PT2)	Syrian	Male	24	Senior	Electrics and Electronics Eng. (Minor in Data Science)
Participant 3 (PT3)	Turkish	Male	27	Senior	Physics
Participant 4 (PT4)	Turkish	Female	21	Junior	Chemistry
Participant 5 (PT5)	Egyptian	Female	23	Junior	Statistics (Double major in Mechanical Engineering)
Participant 6 (PT6)	Bangladeshi	Male	26	Senior	Chemistry
Participant 7 (PT7)	Turkish	Male	33	Senior	Psychology (Former degree: Public Administration)
Participant 8 (PT8)	Turkish	Female	22	Junior	Business Administration
Participant 9 (PT9)	Turkish	Female	22	Senior	Foreign Language Education
Participant 10 (PT10)	Turkish	Male	22	Junior	Business Administration
Participant 11 (PT11)	Turkish	Female	21	Junior	Business Administration

As shown in Table 1, most participants are from Turkey while a Lebanese, a Syrian, an Egyptian, and a Bangladeshi participant add diversity into the research group that is in line with their university's founding principle: to attract students from Middle Eastern countries and educate the next generation of leaders in their home countries. The gender composition of the research group is roughly equal while their ages range from 20 to 33; some participants are doing double major or minor degrees while one is a former graduate doing his second degree at this university. Senior students (4th graders) are slightly more than junior students (3rd graders) among the participants while there is a balance of natural sciences and social sciences regarding their educational background.

Data tool

In the study, an interview form consisting of five semi-structured questions was developed by the researcher considering the specific sub-research questions and the literature. The interview questions were reviewed by a faculty with a specialization in Educational Sciences. Interview questions include questions such as "What have you done during your undergraduate years so far to prepare for your career?" and "To what extent does basing/building your career solely on MCs meet your career goals?"; each question had several prompts to guide the interviewee. There are demographic questions at the beginning of the form to collect data on nationality, gender, age, grade level, and major field of study. Upon approval of Human Subjects Ethics Committee, the researcher contacted over 300 students enrolled in a course targeting career development. Those who accepted to be part of the study gave their consent over Google Forms. Later, an average of 23 minute-interviews were conducted with 11 participants over ZOOM. The interviews were audio-recorded upon consent of the participants. The interview data was transcribed verbatim by using Sonix software.

Data analysis

Data was analysed using content analysis technique; this technique analyses data by coding, categorizing, comparing and concluding from patterns of information that emerge in the data (Cohen et

al., 2018). MAXQDA Software helped the researcher with coding and analysis of the data from transcriptions. After the data were deciphered, they were divided into categories, themes and codes, and then they were interpreted by considering the literature (Yıldırım & Şimşek, 2016; Yin, 2009). An initial code list (17 codes) based on SCCT, micro-credentials, and higher education literature guided the researcher at initial data analysis, and this code list was extended (24 codes) as new codes -mostly from micro-credentials, and higher education frames- emerged from the data.

Validity and reliability

In order to sustain validity and reliability in this study, several measures were taken. Evidence was weighted (Cohen et al., 2018) as higher quality data came in more attention was given to ensure richness in data; data and the literature were compared and contrasted frequently to ensure that valid responses were included in the data, and also rich and thick descriptions were provided to support and provide evidence for findings. Additionally, frequent use of direct quotations, and using a preliminary code list based on literature that was later enriched by the data added to the reliability of the findings.

Results

The data revealed superordinate themes such as facilitating factors that motivate participants to take up MCs in their way to career development. Another superordinate theme drawn from the data is the barriers to adoption of MCs that dissuade participants from relying on their MCs in their career development paths. Whether MCs are perceived as a supplement to traditional university degrees or as an alternative pathway to career development is dealt with as another superordinate theme. Finally, adoption of MCs as an adaptive career behaviour in the context of career-self management model is the other superordinate theme.

Table 2. Superordinate themes, subordinate themes and their corresponding codes, and frequencies

Superordinate theme	Subordinate theme	Codes	Frequency
Facilitating factors	MC-induced enabling factors	employability	high
		prestigious MC institution/company	mid
		tailored/self-regulated learning for upskilling or re-skilling	low
		less commitment (time, money etc.) than a full degree	low
		skills/competence verification/recognition	low
		accessibility (remote, working people, disadvantaged groups)	mid
	HE-induced enabling factors	university education is more theoretical/fragmented	high
		lack of quality education at university	low
		more digitalized (higher) education (after the pandemic)	mid
Barriers	MC-induced barriers	less prestigious than formal certification (conventional university degree)	low
		lack of interaction / social learning	low
		dominance of data science or computer engineering fields	low
		unpurposed/non-strategic accumulation	low
	Work environment-induced barriers	focused specialization in MC fails in system level problems	low
		unauthorized in decision making	low
		ambiguity over micro credentials (on behalf of stakeholders)	low
		little chance to advance / get promoted in the work	low
		prejudice against MC holders	mid
Adaptive career behaviour	Cognitive-person factors	self-efficacy beliefs	high
		outcome expectations	low
		goals/actions	high
	Contextual and personality traits	contextual factors	mid
		personality factors	high

Facilitating factors to adoption of MCs

MC-induced enabling factors: Employability is the most frequently cited enabling factor in that participants have high prospects of being employed after graduation due to holding MCs. To participants:

> …The certificate in the CV will make you go to the interview, and it happens to me a lot. Like when I mentioned, for example, my field is electrical engineering, but I was applying for a software development position. Well, software development is mainly for computer engineering students. But I put in my CV, that certificate, uh, I did a course in software training on LinkedIn… using LinkedIn assessment skills. They interviewed me because of this one. They didn't care about electrical engineering diploma at [name of the university]. They didn't care about other skills. But they [the interviewers] said "Oh, did you do it from LinkedIn? "How much did you pay?" [the interviewers decide to seriously consider this candidate with a prestigious MC and say:] "Tell us about your yourself now". (PT2)

> …so I can put it [MC] first on my CV? I also I have the skills. I mean, I got the chance to get into like, I think eight courses. I took those courses. Even without my mechanical engineering diploma, I would have been able to find a job in the Gulf countries, for example, or in Turkey or anywhere. Well, it [MC] has much less like validity but I would [find a job]. (PT1)

Participants frequently cited accessibility as another enabling factor as they believe remote access to MC programs makes it preferable for those who study at university or work part-time but at the same time wish to equip themselves with the necessary skills set. These participants believe that these skills sets will be required when they graduate. Moreover, disadvantaged groups may also access MC programs and thus their access and equity barriers to education can be removed. To a participant:

> Those courses taken as part of MC programs may help with equity and access in education. Not everybody has the funds to get a four-year university education. Especially in places like Turkey, you may have low schooling expenses but in Europe or in the USA schooling expenses are very high…Thus, MCs may help decrease inequalities in education (PT9)

Participants also equally value MCs if the MC issuing institution or company is a prestigious one. Other enabling factors include the opportunities of tailored and self-regulated learning for upskilling or re-skilling, less commitment (time, money etc.) than a full degree, and that holding MCs may offer skills or competence verification and recognition when it comes to job search.

HE-induced enabling factors: Participants most frequently express their discontent with the education they get from the university as they hold the belief that university education is more theoretical or fragmented; that is, they feel the need to do extracurricular work such as obtaining MCs to compensate for practical experience in real life situations. They also insist that courses at university tend to be either at basic level or fragmented across the curriculum; they enrol in MC programs to see more real-life applications via projects they complete as part of the requirements for the MC program or sometimes they see advanced content in MC programs to cater for the defragmentation of the course content in their enrolled major degree programs. To a participant:

> And to be honest, I know [name of the university] is the best university in Turkey. But uh, I realized, like until the third year, I didn't take any four-year courses during my third year. If I finished my third year and go to the second internship, I didn't know anything about the real-world application. All I studied is theoretical. All I studied is something can or cannot be applied. So when I went to the business world, they didn't care at all about which equation you are using. Um, this [result or reference point] is 0.5 or 0.6, they care about what is really in front of them, transformation of your theoretical knowledge to a physical, physical quantity or something physical you can see. (PT2)

Participants often cite the changes taking place in HE after the COVID-19 pandemic noting that teaching and learning settings have been drastically aligned more with digitalization, and that this is removing boundaries between on-site learning and online learning. As a result, participants tend to question whether holding MCs is equal to or sometimes better than on-campus education; also, some participants seriously question the quality of education they receive at the university that gives way to a swifter adoption of MCs in regard to laying the building blocks of their careers. To participants:

> I mean you win the university entrance exam and enter [name of the university] after a year of studying. You spend about 5-6 years in total considering your undergraduate studies. I wish the current MC programs I have finished and those I still continue, I wish such programs, bootcamps were more popular long ago…I attended an online bootcamp in the USA, this was only possible due to the pandemic, because of the pandemic the bootcamp turned to online. (PT7)

> Now that we have the pandemic, we mostly continue with online education. Before the pandemic, enrolling a MC and getting an online certificate was not that favourable, could be like people would even look down on such a learning experience. Now with the pandemic, we are getting university education in the same manner, I mean our undergraduate education…. We cannot be that negative now, I mean the dividing line between online and on-campus learning is disappearing; we are using similar platforms, teaching and learning techniques. (PT9)

Barriers to adoption of MCs

MC-induced barriers: Participants are also aware that holding MCs may put some barriers to their quest for jobs. To start with, participants often express their discontent with dominance of data science or computer engineering fields in MCs ecosystem. Although such MC programs are not solely and specifically designed for data scientists and computer engineers, but these programs accept learners from all backgrounds, this puts extra burden on learners with backgrounds other than data science and computer engineering in forms of some pre-requisite trainings to be able to start certain MCs. According to participants:

> I would say it depends on the department, depends on the job that you want. I mean, I think for mechanical engineering, it's quite hard to make [an alternative career path]. It's more like complimentary but like for computer engineering and computer science [they may take the alternative path] maybe. (PT1)

> There is a clear-cut distinction between those coming from computer sciences or related fields and those coming from different backgrounds. In the former scenario, they do not take the basic training [maths, statistics] but in the latter scenario, they have to do so. (PT7)

Another barrier induced by MCs is the perceived prestige; some participants believe that holding a MC is still less prestigious than formal certification (a conventional university degree). To a participant:

> Going back to my experience and I am quoting with my manager, what he told me. “Yes, you are a skilled person, you know, exactly [what he said to me], you know, better than me.” He told me this exactly, “you know, better than me. But the final decision cannot be taken by you because you are not holding a diploma.” Okay. Okay. Yes, you know this case. But uh, I was working on the project for three months and when it finished, [it was] taken [from me] and given to the engineer because I am not an engineer yet. (PT2)

Some other participants worry about the lack of social interaction in MC programs adding that the component of social learning or learning from each other in informal settings like coffee-breaks in real life, for example, is missing. Another less frequently cited barrier is the unpurposed or non-strategic accumulation of MCs in that students may be overwhelmed by the MC options available in the MC ecosystem; the advice would be enrolling in MC programs that feeds one’s career prospects rather than enrolling in any available and fashionable MC program out in the market, which may actually have repercussions on one’s career building.

Work environment-induced barriers: Participants categorize some barriers associated with holding a MC under workplace as they believe these barriers may be evident in the work environment, the most visible one being the prejudice against MC holders. Majority of the participants fear that building a career only on MCs may potentially result in prejudice and discrimination. A participant points to the possibility of prejudice at workplace:

> In a competitive environment, university degree holders may have prejudice against those MC holders, especially when it comes to payment [salary] issues. This prejudice may prevail at first but may disappear as MC holders have more experience. (PT3)

Few participants add another barrier that they may have trouble in advancing or getting promoted in workplaces where they will co-exist and work with other traditional degree holders. A participant worries that a traditional degree holder may be favourable over a MC holder in promotions:

> From employer's perspective, if the employer must make a decision between a traditional degree holder and a MC holder, I believe a traditional degree holder may be promoted; I am assuming that the employer has not observed both enough, and does not have enough data to compare both, I mean…A traditional degree holder may be more advantageous. (PT3)

Some participants voiced concerns over another barrier in terms of focused specialization in MC. They hold the idea that if one specializes in a field by holding a MC, he or she may fail when a problem occurs at the systems level; this is the point where MC holders might be viewed incompetent in their daily practices or unauthorized in decision making in comparison to an engineer or a conventional university degree holder, for example. Participants add that such ambiguity over micro credentials still exists on behalf of the major stakeholders such as employers.

Supplement vs. alternative pathway to career development

Supplement to traditional university degrees: A great majority of the participants (n=9) view MCs as a supplement to their traditional university degrees in their quest for a successful career. Participants believe that building a career on MCs may be invalid for students with backgrounds other than data science and computer engineering; holding MCs may help with a more refined search on job search platforms provided that one holds a MC complimenting a traditional university degree, and thus, one may stand out among other competitors for a job. Some other participants view MCs as a second chance to reach a desired level of self-efficacy if one has failed to improve himself or herself during undergraduate years; some believe that MCs cannot replace fundamental disciplines like chemistry, physics, and biology but MCs might be useful for students with these backgrounds. In the case of social sciences, MCs may only be complimentary if an entrepreneur with a business administration background wishes to start his or her own business. Moreover, building a career only on micro credentials is likely to require much more investment (time, money, effort etc.) on behalf of the students who are due to graduate soon; one who starts over a career in a new discipline may be scary for some. According to a participant who perceives MCs as a supplement to traditional university degrees:

> If I add this (MC) to my diploma, I can support the MCs perspective. Eventually, a traditional university degree and MCs constitute a meaningful whole…If one brings these MCs together with the diploma, then others [hiring managers] may say "the applicant has knowledge of theory with this diploma, and additionally he or she reinforced theory with practice by holding this MC; then, this applicant is competent for the position", this is more valid in my perspective. I support the supplement scenario, but I totally oppose to the alternative [to traditional university degree] scenario as a diploma and a MC are not equals. (PT11)

Alternative pathway to career development: A minority of the participants (n=2) view MCs as an alternative pathway to their career paths. One participant highlights the importance of a role model in taking a career path built only on MCs. A comprehensive MC program with competent trainers who have also walked the MC path before and are knowledgeable about the job market for MC holders may motivate students to consider making a living out of MCs. The other participant has already taken a career path built only on MCs:

> In my opinion, MCs can be an alternative pathway to traditional university degrees. I am a psychology major, and this is actually my second undergraduate study, formerly I did a major in Public Administration. I find getting university degree a kind of luxury. I mean one can finish high school and land a job or build a career by taking the MC path rather than going to the university. There is no problem with this; the university is kind of extra but you do not go to university for nothing; if you have the resources and time you may do it but this does not mean you are being career-focused. A university is rather a place where you go on a self-discovery journey or I may even describe those years at university as an extended gap year. That is why I view MCs as an alternative pathway; I mean for job or career MCs are a viable and direct option. (PT7)

Adopting MCs as an adaptive career behaviour

Cognitive-person factors: Participants display adaptive career behaviour of using MCs to develop their careers based on three pillars of the career self-management model: self-efficacy beliefs, outcome expectations, goals and actions. These three pillars influence the purposive behaviour of individuals: using MCs to develop their careers. Based on the data, goals and goal-directed actions seem to guide participants the most among these three pillars. Participants have set specific career goals and put these goals into action to realize an outcome. In other words, participants have set career goals of obtaining MCs to advance their careers; most of them put this career goal into action by enrolling in MC programs, actually obtaining MCs, or starting to look for career opportunities by using these obtained MCs with the prospect of producing *outcomes/attainments*, the last component of in the career self-management model – that is eventually finding a job or advancing in their careers. To a participant, career goals are quite relevant to MCs:

> I will start learning Phyton soon that will count as a MC now that I am a physics major. Not entirely on MCs, but I am planning a career where I will use MCs because my future career will focus on analytics and estimation or even some artificial intelligence applications…In this regard, Phyton will be crucial for me, I mean that will help me stand out in my career. (PT3)

As for self-efficacy beliefs, participants stated their own abilities such as working knowledge of basic programming languages, existing subject matter knowledge in statistics, and researching skills as well as internship experience which led them to the adoption of MCs to prepare for their careers. Regarding outcome expectations, participants emphasized that they are aware of the possible valued and pleasant consequences of adopting MCs in their career preparation. In other words, self-efficacy and outcome expectations are believed to promote adaptive career behaviour of using MCs to develop their careers.

Contextual and personality traits: According to the career self-management model, an individual's purposive behaviour (using MCs to develop one's career) is also shaped by contextual factors and personality factors. Based on the data, personality traits seem to guide participants the most between the two dimensions. Participants state specific personality traits such as entrepreneurial, conscientious, and extraverted that align with using MCs to advance in their careers; in other words, they believe that the adoption of MCs relevant to their personality traits can be translated into a boost in their career development. According to a participant:

> Since Preparatory School I have visited several career fairs to network with others. I mean to learn about internship opportunities or job opportunities after graduation…It depends on the person a little as one can be introverted or extraverted, but you grow throughout the years you spend on campus and this kind of determines your options [after graduation] (PT10).

As for the contextual factors, participants seem to be influenced by a supporting environment where MCs are valued as a booster for a desired career and where barriers to career success are minimized.

Discussion and Implications

This study aims to examine the phenomenon of MCs within the context of HE and career development by analysing the accounts of university students regarding their experiences and interpretations. Firstly, two prominent MC-induced enabling factors that motivate participants to device MCs in their way to career development are employability and accessibility. As for employability, data is consistent with Kurt and Fidan's (2021) findings; in their recent study on the role of university in career construction Kurt and Fidan depict the expectations of university students and the realities they encounter. Kurt and Fidan also conclude that university education faces real challenges in providing satisfactory opportunities to increase the employability of university students. As a result, it is not surprising to see students engage in supplementary or alternative career behaviours. Similarly, in his study to understand employer's perspective regarding the use of MCs by potential employees, Gauthier (2020) conclude that MCs can bilaterally be beneficial for the holder and employers, suggesting that MCs increase employability of the applicants. Likewise, Tomlinson and Anderson (2020) confirm that job-seeking graduates may benefit employability capital aspect of MCs as they prove to their potential employees that they possess non-academic, non-formal experiences that are still employment-related credentials.

Regarding HE-induced enabling factors, participants are rather discontent with the university education being more theoretical or fragmented, and as a result, they tend to adopt MCs to cater for the applicability of theory into practice; they value MCs in this sense as participants also have the formal certification of applied knowledge via MCs. This finding in the data is consistent with Gauthier's (2020) study such that university degree and transcripts were questioned by the participants- employers- and also that candidates tended to include MCs as part of their application documents to show proof of certified learning in which they were able to apply their knowledge and skills to everyday problems or situations. Another HE-induced enabling factor is the changing mindset on behalf of the students; participants noted that after the COVID-19 pandemic teaching and learning settings have been drastically aligned more with digitalization. As a result, adoption of MCs in such a redefined digitalized landscape for HE is easier for university students now that the dividing line between on-campus and online learning as well as the one between traditional university degree and MC-based proof of competency and skills is blurring.

Secondly, two leading MC-induced barriers to the adoption of MCs that made participants hesitant to build a career on their MCs are their discontent with dominance of data science or computer engineering fields, and the perceived low prestige. These data are partially consistent with the literature. In their study, Hollands and Kazi (2019) surveyed learners who enrolled and completed programs offered in leading MC providers in topics such as "business and finance…social science, computer science, information science, and business and management" (p.2). In their findings, the learner profile pursued credentials in a variety of professional fields including, "…finance (16%); information technology (10%); business management and administration (9%); science, technology, engineering and mathematics (9%); marketing, sales and service (8%); teaching or education research (7%); education administration (6%); and non-profit management and administration (6%)." (p.6) Their findings in 2019 point to a spectrum of social sciences and natural science or informatics related credentials. Those enrolled in science, technology, engineering and mathematics only account for 9% of learners, and inside this population a relative dominance of learners with a data science or computer engineering background may be considered normal. This inconsistency may be associated with the misconception of the participants in the data that MCs equal to data science or computer science related credentials; only a few participants mentioned business administration related credentials, but a great majority mentioned enrolling credentials related to computer programming languages. Another MC-induced barrier to the adoption of MCs is the perceived prestige. This finding is parallel to Dyjur and Linsdstrom's (2017) study in which non-formal credentials were perceived as less prestigious than formal certification.

Turning to work environment-induced factors, participants have reservations about any possible prejudice against MC holders in the workplace. While some participants hold egalitarian perspectives on MCs in the sense that as long as the MC holder is competent and performs tasks as expected, then, there would not be any prejudice against the MC holder, or the employer would not discriminate one against traditional university degree holders. However, some other participants firmly believe that MCs are a new trend even to employers. In a situation where promotion is the case in the workplace, they fear that they may have trouble in advancing or getting promoted in their career as a MC holder. This belief is partly rooted in the ambiguity as mentioned by Resei et al. (2019) who concluded that there is still ambiguity over micro credentials especially in Europe; Oliver (2019) also emphasized the ambiguity over micro credentials on behalf of the learners, the target consumers, or the employees. Now that Turkey is a country with full membership for the Bologna Process / European Higher Education Area since 2001, and also that MCs are only recently a growing phenomenon in Turkey, this finding is quite consistent with the literature.

Thirdly, students align more with the idea that MCs are a supplement to traditional university degrees rather than an alternative pathway to career development. Their major reasons for being proponents of the supplementary perspective is the belief that students with data science or computer engineering background leave little room for students with other majors to flourish in these tracks. Furthermore, these participants believe that, indeed, traditional university degrees compete during job search while holding a MC is a plus that helps candidates stand out among others. However, being an opponent of

the supplementary perspective rests on the need for role models who have walked the MC path or setting grand career goals as early as freshman or sophomore years; such a role model may be illuminating and inspiring to build a career only on MCs even if one comes from a major other than data science or computer engineering, and starting to build a career on MCs as early as possible would give one enough time before graduation to master another field of study or advance in one's own field of study. The findings in the data are parallel to findings of Oliver (2019) and Resei et al. (2019) rather than those of Fong et al.'s (2016) since a great majority of the participants view MCs as a supplement to traditional university degrees.

Finally, participants' adaptive career behaviour-their adoption of MCs as an adaptive career behaviour in the context of career-self management model as suggested by SCCT- is mostly shaped by the cognitive-person factors of goals and actions. In Wendling and Sagas's (2020) study self-efficacy and career goals were found to be direct facilitating predictors of career planning behaviour of their participants. The findings as to goals and actions in this study are quite parallel to this finding in ways that participants in this study most frequently related their adaptive career behavior (using MCs to advance in career) to setting specific career goals and enacting them with persistence. Additionally, the data revealed that participants' display of this adaptive career behaviour is also contingent upon the personality traits of being entrepreneurial, conscientious, and extraverted. In Wendling and Sagas's (2020) study, "conscientiousness and openness were not directly related to career planning, only indirectly via self-efficacy and goals." (p.8) Wendling and Sagas's personality traits of conscientiousness and openness have been voiced by the participants as conscientiousness and extravertedness in this study with the addition of being entrepreneurial, all of which contribute to participants' adoption of MCs as an adaptive career behaviour in the context of career-self management model.

Regarding implications, this research has implications for research and practice. As for research, this study provides qualitative empirical evidence to MCs literature regarding the enabling factors and barriers to using MCs in career development, the supplementary versus alternative pathway debate, and this research also validates the career self-management model as suggested by SCCT with the introduction of MC adoption as an adaptive career behaviour and entrepreneurial personality as a factor that is shaping one's career behaviour. Considering practice, embedded career development centres of universities and career development professionals must seriously consider ways to include MCs in their career development seminars, workshops or tutorials. In universities where career planning is an undergraduate course, MCs need to be integrated into the curriculum. Results out of this study may be guiding for students enrolled in Turkish universities or abroad while they are deciding on their future career investments. Regarding limitations, some additional measures can be devised to increase the reliability or transferability of findings such as member-check and using other raters. By doing so, transferability of perceptions and experiences can be better achieved in other settings where learners may consider adopting MCs in their career development. Future research may consider involving graduate level students in the research group who may display diverse adaptive career behaviours than undergraduates. Future researchers may include more perspectives from other stakeholders such as employers and academics.

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