THE INTERNATIONALISATION OF HIGHER EDUCATION IN GERMANY'S HEIS

A COMPARATIVE ANALYSIS OF INTERNATIONAL STUDENTS' SUCCESS RATES IN SELECTED FIELDS

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Doctoral Thesis

As part of the requirements for the Academic Degree

Doctor of Philosophy

Europa-Universität Flensburg

Submitted: 20th December 2021

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"[.....]most students are eventually faced with very much the same sorts of problems and experience similar types of difficulties in attempting to establish competent membership within the communities of the college they enter." (Tinto 1988 p.449).

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Foreword

International students are a diverse group of people. Their contribution is manifold – from their impact on the institutes of higher education where they choose to study, to their role as a part of the demographical structures in our societies. International students are nothing new. They have emigrated to learn elsewhere on the globe, in the form of bards, philosophers, and theologians. Up until the mid-1990s it was more difficult for many students to be an international student – you had to consider whether the qualification you would achieve was accepted in the country that you would like to work and live. To ameliorate the difficult situation 48 Bologna signatories declared that they would accept and enact processes for the mutual recognition of qualifications. The aim was to facilitate the movement of students that would become a mobile qualified educated labour force. Their choice of destination informs us of the socio-geographical factors of sending and receiving countries. Moreover, researching international students also requires recognizing migration processes. Few other groups have such a disjointed position to education and migration as that of the international student, such that international students are often not considered to be immigrants (Coughlan 2018).

Theoretically, when a student registers, it is to achieve a qualification. When the Higher Education Institution accepts the students' registration, it is intending to enhance the students' abilities and capacity to progress and qualify. International students in Germany's bachelors' degrees have given cause for concern because of their high dropout rate (DAAD 2018).

This concern has quite a negative impact, the international student is deemed to be not as capable of completing the sought-after qualification as the native students. This means the international student started studying for a diplom/ bachelor's degree and that they then discontinued without successfully completing the programme. This dropping out is an act and a process that is loaded with negativity.

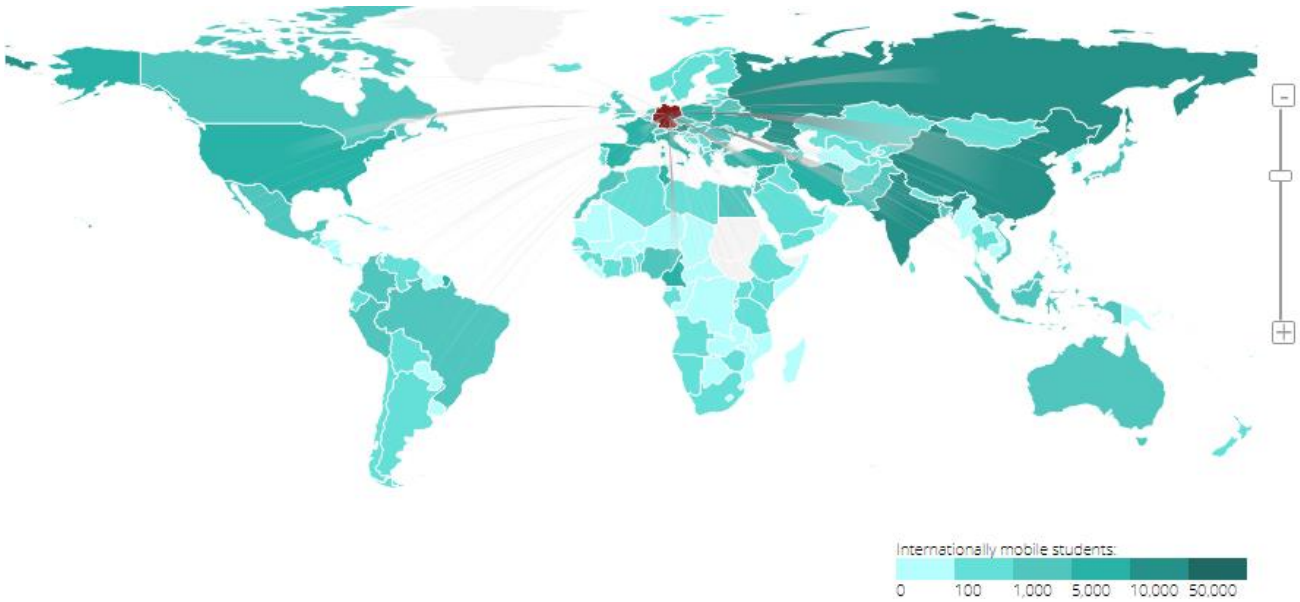
I set out to address the international students' success rates of the HEIs because this shifts the approach to understanding what the success rates of HEIs are and what role the international student plays in these success rates. It focuses on the student as an internationaliser of the HEI because if someone moves house and home to study in a foreign country, then their determination to qualify is not less than that of the native German colleagues. We are living in a political climate that is experiencing the challenges that come with globalisation. International students contribute not only to providing and injecting our societies with cultural wealth but also provide knowledge and come with a willingness to learn about other cultures and forms of education. Looking at the international students, and their contribution to the success rates of HEIs in Germany reflects both the ongoing provision in Germany for international students, as

well as the contribution of this group of migrants to Germany's education and labour markets. The motivation for this work lies in the contemporary political climate, where scaremongering presents internationalisation as a threat and foreigners as a cause of fear. Yet by understanding international students' success rates in Germany this work can explore potential developments from an educational, labour market and migratory perspective, and dispel illusions caused by a dearth of knowledge.

Germany's Higher Education Institutional Landscape

Map of the global flow of international students to Germany (Köllen 2020)

The following map is from the UNESCO webpage and depicts the flows of internationally mobile students to Germany according to the US data.



Source: UNESCO 2021.

Acknowledgement

First and foremost, I would like to thank Prof. Dr. Gerd Grözinger for his mentoring, supervision, and his support during this extensive work. I've learned many a thing about the official statistics, and a thing or two about cooking whilst on the road to Kiel. Thank you also to Prof. Dr. Volker Müller-Benedict, together they have provided spaces for discussing the progression of my work, without their encouragement and constant reappraisal, none of this would have been possible. Furthermore, I would like to thank both the BMBF and the Europa-Universität Flensburg for providing resources that helped me to complete this work.

Over the course of this work, this project has taken on the pseudo-name - "Voldemort - *that which cannot be named"(Rowling 2005)* – without Heiner, Riona, Cian and Dara's humour, this project would have been a non-starter. Thank you Heiner for being there and for making this possible. Thanks also to Flo and Michael for their discussions about societal expectations of Germany's formal education's input and output. Vincy and Arty, you're a laugh a minute and both are impossible acts to follow, but I'll not give up trying. Luckily enough I have a few friends who knew and appreciated how much juggling I was doing, so thank you to Audrey and Laura.

There are two other people: one that has listened patiently to me and encouraged me the whole way through this, his ability to query remains amazing – Dad, thank you for being inspirational. And Mam, although you're not here you're never gone, and yes, formal education must change, society, of which we are a part and actors within, must recognise that barriers still very much exist to some and not to others. Those barriers must be identified, recognised, and removed.

Abbreviations

The following list includes institutions and organisations that will be encountered throughout the book. Their role as stakeholders[1] in the international students' success rates in Germany's Higher Education Institutes (HEIs) varies not just from institute to institute but also over time, as their functions may vary, expand, or retract, and the funds with which they may be supporting HEIs in general varies. This, in turn, is related to societal constellations and demands. In this book, a stakeholder is any organ or institution that plays a role or has a symbiotic relationship with international students' and their potential to contribute to the HEIs' success rates.

BMBF: Bundesministerium für Bildung und Forschung – Federal Ministry of Education and Research
CHE: Centre for Higher Education
DAAD: Deutscher Akademischer Austauschdienst/ German Academic Exchange Service
DZHW: German Centre for Higher Education Research and Science Studies
EAHE: European Area of Higher Education
Econ: Economicx
EE: Electrical Engineering
EU[2]: The European Union
HEI: Higher Education Institutions (all recognised institutions – public, private, pedagogic, technical, geographical located in Germany)
HIS: Hochschul Information Systems
HoStaNu: Hochschulstatistiken Nutzen – Using Administrative Data
HRK: Hochschulrektorenkonferenz – The German Rectors' Conference
ME: Mechanical Engineering
OECD: Organisation for Economic Co-operation and Development
PISA: Programme for International Student Assessment
STEM: Science Technology Engineering Maths
TU: Technical University
UAS: University of Applied Science - (Hochschulen/ was FH Fachhochschulen)
Uni/ U: University
UN: United Nations
UNESCO: United Nations Educational, Scientific and Cultural Organization

[1] Stakeholders are defined as bodies with a vested interest in the institutions of higher education.
[2] The 27 countries are Austria, Belgium, Bulgaria, Croatia, Republic of Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Rep. of Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden (EU, 2020).

Abstract

International bachelor students' dropout rates were recorded at over 40% and exceeded those of their German colleagues in Germany's HEIs (Heublein et al, 2017). International students have a different symbiotic relationship to the HEI than domestic students and resident foreigners. International students embark on crossing at least one physical border to study in Germany, they increase one aspect of the internationalisation process of the HEI, they train to be potential labour for the local, regional, national, and international market, they act as diplomats for their country and when qualified, act as a diplomat for, in this case, Germany and the German educational system.

Rather than analysing the dropout rates, this work addresses the success rates, and instead of just a snapshot of the international students' success rates, this work will review the success rates covering twenty years of higher education in Germany's HEIs. Specifically analysing mechanical and electrical engineering, and economics fields of study, this work includes both the diplom and bachelor students using the official statistics of all HEIs in Germany to create a cross-cohort analysis from 1995-2015.

This empirical work analyses if the international students' success rates are weaker than the German students' success rates. The results showed that international students' success rates in Germany in mechanical engineering were better than their German colleagues in most of those HEIs in the sample. The results also showed that the group of students with non-German citizenship and German secondary school qualification produced weaker success rates in most of the HEIs.

Background and Layout

In 2017 HoStaNu, a BMBF funded project commenced its work on researching student success rates in Germany, with the focus on mechanical engineering as a field of study. HoStaNu set about researching success rates at an individual institutional level by using a cross-cohort analysis. The purpose of the project was twofold: first, to use the official statistics to measure success rates, and second to establish what the success rates were. Researching international students' success rates was borne from the project. The following book addresses international students' success rates. Chapter one is an introduction to the topic and the aim of the research. Chapter two reviews the literature for this work and together with chapter three delves deeper into concepts, processes and the relevance of international students, and their success rates within higher education from a multidisciplinary approach. Chapters four and five continue with the methods, and approaches, describing the databanks as a source of secondary data, and how this work applied a sturdy cross-cohort analysis, also presenting data that explains why these fields of studies were analysed. Chapters six and seven present and discuss the data, and that is followed by the concluding chapter and the recommendations.

1 The relevance and aim of this research

1.1 International students' success rates and internationalisation

"*A good university is an international university*" (VSNU, 2020)[3]

In December 2019, the Netherlands' rectors wrote an open declaration about the importance of internationalisation in their institutes of higher education. They explained that they see it as their responsibility to facilitate that each student experiences internationalisation. This happens through creating an international course, encouraging students to spend time abroad, and by welcoming international students to the Netherlands. Their embedding of internationalisation equips the qualification and the qualified student with international experiences, and this, in turn, facilitates the students in how to deal with various aspects of life, including the labour market. Therefore, internationalisation involves experiencing cultures

[3] The Netherlands does much to ensure that Internationalisation is a basic concept and whether it happens at home or abroad is considered a responsibility of the HEIs.

other than their own national culture. They also explicitly underpin the importance of internationalisation in education because of the positive social impact it has through interaction. This interaction reduces the likelihood of intolerance or bigotry (ibid). It prepares the student for economic and social contributions and awareness of the world within which they live (Bok 2017, VSNU 2020). Therefore, the international university has the potential to provide a broad spectrum of facets for the local and global societies within which we live, and this awareness should shape how we act and the choices that we make, the paths that we construct, thereby enhancing, embracing, and embedding inclusiveness.

There is an array of forms of internationalisation. Internationalisation may incorporate many different policies (Wächter 2003), extending from the books that fill the library to the courses that are offered, or the students that are educated, such that internationalisation becomes a way of life (de Wit 2011, Altbach Knight 2007, Knight 2008, OECD 1999, Wächter 2003). One piece of the internationalisation puzzle is an international student, which in turn allows for Internationalisation at Home, and this is a process where the international students internationalise the host university (Kercher 2018, Knight 2008, Wächter 2003). It is an elegant form of internationalisation because it provides an international space for international students and internationalises the host location. Moreover, it provides a form of internationalisation for the native students, thus making internationalisation possible also for those students who may not have the opportunity to travel, due to financial reasons, or because of their demeanour (Wächter 2003). Furthermore, this process also provides a particular type of internationalisation – one which is neutral because it comes with the diversity of international students rather than a geographical hegemony (Knight 2018).

However, in order to attain or attract international students to study a complete programme, there needs to be a real chance of graduation – uprooting to move to another country to live and learn without the prospect of qualifying is too costly – not just financially, but also mentally. Not succeeding leaves, the international student in a situation where they are deemed less capable than their native colleagues – as is the negative connotation of not succeeding (Tinto 2012).

That means the process of admittance and acceptance demands a great deal of cultural understanding on behalf of the applicant and the university, and a willingness by all actors to gain cultural knowledge (Thi 2008). This does not mean the standards should be lowered, for the international student seeks the challenge. When an international student applies to a university, they take multiple factors into account, including the prerequisites for entry, and the planned recommended study time, to name but a few. Lowering the levels removes the

challenge. But are the international students just as capable of succeeding in Germany's HEIs as their German colleagues? How capable are Germany's HEIs in retaining the international students? Can the programmes retain the students? Do those international students who complete their programmes manage to complete them in a similar number of semesters to that of their German colleagues? What are the international students' success rates in Germany's HEIs? Did the bachelor accommodate better success rates in the HEIs than the older German diplom[4]? By measuring the international students' success rates with the administrative data these questions can be tackled.

The DAAD (German academic exchange service) supports students and staff by encouraging the different internationalisation processes. One such process is having international students start, study, and complete their programme in the German HEI. International students are encouraged to come to Germany and study and qualify in Germany, therefore if institutions seek to attract the international student it must be to have them succeed, and it is their responsibility for success to be feasible. In 2017 the DAAD reported the Education Minister's satisfaction with having more than 350.000 international students in Germany, and 46.000 researchers working in academia in 2016 (DAAD 2018)[5]. Unfortunately, the DAAD was also able to report that:

"*Regarding the international student's dropout rates 45% of international students drop out in the Bachelor programme, and 29% dropout in the Master programmes. German students are reported to have a dropout rate of 29% in the Bachelor programme and 19% per cent in Master programmes." (DAAD 2018 O.T.)* [6]

These higher dropout rates for the international students raise questions about capabilities, and according to the DAAD report, the international students are less capable of contributing to HEIs success rates than the German students. But has it always been like this? Here the DAAD presents the results of the bachelor, which is a relatively new degree in the German higher education portfolio. It is a product of the Bologna Process (Hackl 2001) which converted the higher educational system[7]. The changes included introducing different types of degrees. Over the course of the last two decades, there have been changes in the higher education structures with the phasing out of the older diplom and the introduction of the newer

[4] The German Diplom was / is a five-year University/Technical University Qualification; or a four-year UAS qualification. This work uses the term diplom and not diploma.
[5] The DAAD support internationalisation in education through various mediums and provide a constant source of support also to researchers of their processes, and provide these in accessible forms for all. (DAAD 2018)
[6] Own Translation
[7] Here the book refers to educational systems, and the development of new systems through the higher educational policy.

bachelor. The question is if we analyse the diplom and bachelor, how do the international students perform in these systems? If we combine these two forms of education what would the results look like? Does the new educational system in Germany show improved success rates? If the newer system shows improvement, that would mean that the success rates were even lower in the diplom programmes. So how do and did the rates vary in the bachelor and the diplom in the most frequented fields of study? What can we learn from comparing the success rates of the international and German students in Germany's HEIs?

1.2 Contextual framework and problem at hand

"*Only comparisons afford explanation*." (Durkheim 2012 p.41)

The internationalisation of higher education has intensified over the course of the last 50 years (Bessey 2012, de Witt 2011, Florida 2014, Gropas 2008, Grözinger 2011, Heublein et al 2014, Heublein and Schmelzer 2018, Isserstedts and Schnitzer 2002, King 2012, Knight 2008, Knight 2018, Massey et al 2003, Mazzarol and Soutar 2002, OECD 2017, OECD 2019, Rech 2012, Rienties et al 2012, Sharples et al 2016, Teichler 2007). There are different reasons for internationalising the respective higher education institutions. One of the purposes of the internationalisation of higher education is also to solve problems within the global context (Mostovova and Hetze 2018). Higher education provides for knowledge creation, and international students emigrate and become immigrants and this process of migration comes with knowledge circulation and labour circulation that can embrace challenges and find solutions (Knight 2018, Knox 1992, Massey et al 2005). However, not all students succeed in completing their qualifications (Ebert and Heublein 2017, Bandorski et al 2019, Heublein and Schmelzer 2018, McGrory 2020, Thomas 2017). Ongoing research focuses and correctly analyses why students, including international students, discontinue their higher education, researching extracurricular programmes (Rech 2012) and engagement (Kuh et al 2005, Thomas 2017, Watson et al 2011) amongst international students.

Yet, there is a dearth of knowledge surrounding comparative analyses of the success rates of international and German students in Germany's HEIs, much of the focus is on either only the national students with little information on the internationals and much reliant on the work of the DZHW (Heublein et al 2004, Heublein et al 2017, Heublein and Schmelzer 2018). Or to a somewhat lesser extent the official statistics (Destatis 2020) that provide a very limited overview of success rates in Germany, despite the extensive data that they have at their disposal.

Exactly this data source will be used, and this work will show that the official data provides for an expansive understanding of comparative success rates in Germany. There is a need to measure and compare the success rates of international and German students. These comparisons show what the results of the Bologna Process are, and what happened to success rates by introducing the bachelor and phasing out the diplom (McGrory 2020). Hence, this lack of comparable results between German and international students, between diplom and bachelor, between different fields of study will be addressed with this work.

1.3 Relevance of and reason for this research

"*if you think education is expensive, try ignorance.*"

(Bok 1978)

Educating and qualifying international students should mean knowing what rates of international students succeed in Germany's HEIs. The rates are relevant because they provide information about the rates of qualifications. The rates of qualified international students are relevant because the international students will choose a destination where they can qualify. The international students that choose to study in Germany, are potentially part of the labour market and by qualifying in Germany they are being prepared for the diverse labour market situations near and afar (OECD 2019). One of the most popular areas of study amongst international students in Germany is the STEM[8] fields of study (Destatis 2020).

International STEM students choose to emigrate to their destination for various reasons, including to qualify with a good quality qualification that will also open doors to employment opportunities in their destination countries and/ or their home countries (British Council 2015). The international students choose their destination to internationalise their portfolio and gain a globally recognised, reputable qualification. Choosing to achieve this qualification means aiming also to qualify and in the recommended time assigned to the chosen programme. Qualifying international students in the STEM fields also means attracting them, to attract them the host country must compete with other reputable educational systems, and potentially offer qualified graduate employment opportunities. According to the British Council, the increasingly competitive markets lead to increasing higher-skilled labour which needs qualified staff, and this is a problem not only in the UK but also in the US.

[8] Science Technology Engineering and Mathematics

In the US The Keep STEM Talent Act of 2019 Bill was introduced to make it easier for international students qualified in STEM subjects to remain and work in the US (Congress 2021) the aim of the bill included appeasing the needs of the US STEM labour market that were not being met by American students (Graeml 2019). However, this also means that the bill was orientated toward qualified international students, meaning that it remained important for the international students that would come to study, that they could also qualify.

Previously when international students qualified in Germany, they were qualified also for the German labour market with a German qualification. Study programmes were in the form of a university or technical university diplom and had a regular study time of 10 semesters in a university or technical university[9]. In the 1990s to accommodate the skilled labour deficits in the international labour market, the governments recognised the need for mutual recognition of the qualifications (Hackl 2001). The structural reforms that ensued included introducing bachelor's degrees, which would also reduce the duration of time needed for studying and qualifying in a programme, and this should also make the programmes more attractive because of the shorter time, moreover, this would also increase the number of qualified students. Increasing the number of international graduates is relevant for Germany's labour market because these particular graduates add to the needed labour supply.

Reducing the time from the 10-semester diplom to mostly six-semester bachelor programmes would make the programmes more comparable with those in other countries and through the mutual recognition of degree type, the similar duration and shorter time should make achievement goals possible (McGrory 2020). Reducing the time-to-degree is not only important for the students or the labour market but also relevant for calculating the capacity and needs of the HEIs because the prolongation of the "duration of time-to-degree" is costly for the HEIs (Kramer 1993). The duration of time for the study programme is relevant in order to understand how long international students need to complete their programme, and how much longer this is in comparison to the Germans, and how the duration compares to the recommended duration of study time. Furthermore, the reduced time-to-degree would then provide the international students with a shorter programme, possibly making the German degree more attractive because it would be shorter and less costly, in terms of the time it took, over that of the older diplom.

Remarkably, despite Germany's stronghold amongst the German students in the STEM subjects, and Germany's global reputation for high-quality technical products, Germany is not

[9] The German Fachhochschulen/ Hochschule/ University of Applied Science with their shorter diplom FH programmes will be explained below.

attracting the international students that it had hoped it would attract, furthermore reports have shown that there is a need for international STEM students in the respective labour market (Mostovova and Hetze 2018 p. 4). This need for increasing the amount of qualified available labour in Germany needs to be addressed (BMBF 2020). These demands were also formulated with the creation of the Sorbonne Declaration.

By signing the Sorbonne Declaration in 1998 (Hackl 2001) Germany, together with the UK, France, and Italy, but remaining independent of the EU institutions, declared a joint interest in mutual recognition and hence created a structure that would facilitate labour movement. This labour movement could be made possible through the acceptance and recognition of degrees that were attained in the signatory countries. It also made it more feasible for foreign or international students to want to study in Germany because their acquired German degree would be recognised in other countries and therefore the qualification had increased mobility. Hence the importance of international student success in Germany's HEIs reflects the ability of international students to qualify in Germany, and also to equip the graduate with a choice of where it could work as qualified labour in Germany, or elsewhere in the signatory regions. By introducing the bachelors' degrees into Germany and gradually phasing out the diplom qualification, Germany was structurally equipping itself for mutual recognition. Whence facilitating the mobility of qualified labour, on a regional, national, and international scale.

The declared changes in policies, such as mutual recognition, are not alone to serve the labour market, but our understanding of higher education and our perception of what higher education provides and what higher education may need. A quintessential part of our universities are students, and with the ever-increasing internationalisation, the international student body is a part of the student body. Therefore, domestic research that focuses only on the German students is ignoring an important litmus test of a fundamental system within its society[10]. It is failing to address this aspect of Germany's higher educational processes. Analysing these rates reflects if and how the internationalisation of the higher education system through the Bologna Declaration and its educational process has changed the HEIs' success rates. The international students' success rates reflect the role of the university as an international university because it reflects the comparative ability of international students to succeed and the ability to show how HEIs function. Can an HEI produce comparable success rates amongst and for its international students and its German students? Is this reflective of the

[10] King (2011) has expressed the importance of understanding the international students as a migrant, and that they are often excluded from this section of research, also much of the DZHW and the Destatis research excludes the internationals and the migrant students from their core body of analysis (Grözinger McGrory 2020).

HEIs ability to understand international students' abilities? If we understand function to mean the ability of international students to succeed in Germany's HEIs, does the internationalisation process in Germany's HEIs function? The rates reflect the position of international students' and their capabilities. Their capabilities also reflect our diverse ideas of what universities are. Jürgen Habermas wrote about the university and the idea of the university and questioned our understanding and our expectations of what a university actually means and is, such that when "[t}he doors stand open, and at any moment a new face can suddenly appear, a new idea can unexpectedly arrive." (Habermas 2008 p.21), through exchange an opening of new ideas can unfold and is encouraged through providing structures that have the potential for embracing and encouraging a diversity of interactions. Therefore, this work will also look at internationalisation, the processes, migration, deliberation, and the provision of structures that are aimed at facilitating internationalisation in this new system of education. The role of international students' success rates is to communicate both the function and the functionality of the internationalisation of higher education, specifically focusing on the case of Germany.

1.4 Definitions

By using the official statistics, the work can identify four groups, which will be elaborated on in the methods section. However, for clarification, international students are students that are recorded as foreigners with a foreign right to matriculate.

The term success (Tinto 2005) is used to describe the positive outcome of the examinations, regardless of transferals. The rates measured will be explained in the methods sections, and the literature provides background on methods used.

An HEI can be public or private, a university, a technical university, or a university of applied science[11]. There is no student age restriction applied, indeed that means indirectly it also includes those that could be defined as non-traditional students.

[11] In Germany the Fachhochschulen changed its name to Hochschule, or University of Applied Science, they are also in both public and private hands. The university of applied science has traditionally been more practice based than theory based. In the past the core differences included that they were not research based universities unlike the university or technical university. They also have a different semester start and therefore part of a different model – where in most cases their winter start is September unlike most universities that have a October winter start.

1.5 The objective of this work

The official statistics provide insight into how structural change has developed over time (Teichler 2007). A wide range of literature provides information about approaches taken and issues that are being addressed regarding either student success, or internationalisation in higher education, thus providing a background in themes that indirectly touch on international students' success rates in Germany. However, much of the literature focuses on the bachelor alone, but this work will address the role of the diplom and the bachelor for international students and their success rates, thereby filling a void in the knowledge about whether there are comparable success rates between the different degree types. In doing so, the work addresses the impact of the internationalisation process through the changing systems in Germany's higher education.

Using the official statistics, this work not only asks if international students success rates have improved with the introduction of the bachelor's degrees, but also whether the students complete their studies in the set duration, and whether or not the success rates in the combined diplom and bachelor qualification are comparable with that of their fellow German students. It also addresses the case of the success rates of those students who do not possess German citizenship but have qualified to study through a German high school exam. Therefore, the approach is one that focuses on rates of success rather than student dropout. Looking at mechanical engineering, electrical engineering and economics, this work analyses three of the most attractive and most frequented fields of study in Germany.

The work will address the success rates of international students in Germany's HEIs and will point out several issues that are being addressed and some which remain unaddressed. The main focus is the bachelor and the university and technical university diplom in the form of a synchronised variable, and independent of each other. This book analyses what the international students' success rates are, and if there are identifiable trends in the international students' bachelor and/ diplom success rates.

1.6 The spectrum of research

In focussing on international student success rates and taking the whole study period of the degree as the focus of the analysis, the work also poses the question of how international students' academic cultures influence the success rates of different international students and how comparable these regions are. To what extent has the Bologna process had an impact in

shaping the type of internationalisation of Higher Education? In concrete terms, did the shorter duration of the bachelor coincide with increased success rates for the international and or the German students?

In the review of literature chapter, the author shows the spectrum and diversity of the issue at hand, which has led to intricacies in the conceptualisation and scope of the analysis. The personal, cultural, and social (PCS) approach was used for the literature review (Thompsen 2006) it is a method often used that breaks down the analysis to ensure a personal, culture-based analysis of the structures to ensure that where our data does not provide insight into questions, other studies are addressed. Furthermore, PCS allows stereotypes that have been created to be questioned– such as, international students producing poorer success rates in HEIs.

1.7 **Interim Summary**

This chapter opened up the discussion of international students' success rates in Germany's HEIs and the need to address their success rates not just as an individual facet but as part of an overarching function of the HEIs. It introduced the relevance of international students and the internationalisation within Germany's higher education system. Furthermore, it identified that there is a need to explore what research has been carried out on internationalisation on a global and national level. This also means identifying cases, or countries, and research in these countries on international students, and potentially international students' ability to succeed. The next chapter is the literature review that delves into concepts of student success in general and thematically addresses literature in those countries that are popular destinations for international students. This is followed by a chapter that sets the framework for further analysing the international students and the fields of study. Chapters four and five will explain why the official statistics are suitable for this research and include the variables used, including the methods section which elaborates on how the analysis was carried out. Chapters six presents the data per field of study and descriptively answer the research questions, moreover, where feasible inferential analysis will be presented. This is followed by a discussion, a conclusion chapter, and some recommendations.

2 Literature Review

"*Much of the research on student attrition has not been particularly useful to those in the field who seek to develop and implement programs to improve retention and completion because it assumes, incorrectly, that knowing why students leave is equivalent to knowing why students stay and succeed."* (Tinto 2012 p.5).

2.1 Overview

International student success rates in Germany are ultimately about the ability of the international students to succeed in Germany's HEIs, the comparability of internationals to Germans, and the comparability of success rates between degree types and fields of study. The following literature review is based on research to date that is relevant to understanding the international students' success rates in Germany's HEIs. The review uses the five perspectives as recommended by Hüthner and Krücken (2016), that being domestic, interdisciplinary, international, methodological, and theoretical perspectives. This work will begin with the international literature. The section on student success will begin with the USA, as it is home to Tinto, and then proceed to Australia before eventually moving to the UK and the Netherlands which are then closer to Germany, selecting the most relevant pieces of research.

2.2 Internationalisation of Higher Education

International students' success rates are one aspect of how internationalisation develop higher education. International students provide a fundamental building block in the operationalisation of internationalisation through the process of "internationalisation at home" (Knight 2008 p.22, Wächter 2003 p.5). However, dealing with international students, and including both, the concepts of internationalisation and globalisation will have an impact upon the choice of theories used to understand the internationalisation of higher education. To isolate and analyse international student success on a micro-level would negate macro influences (Wächter 2003). Moreover, internationalisation involves processes, whereas globalisation sets the scene (Altbach Knight 2007), yet the concept of internationalisation is not completely clear cut. For example, De Wit (2011)[12] lists misconceptions of internationalisation of higher

[12] De Wit (2011) lists what he calls the nine misconceptions of internationalisation, amongst which he questions the assumption of internationalisation being equated with programmes through English, and that having an aim and achieving internationalisation are often confused.

education, one such misconception is that merely having international students automatically creates an internationalised HE institute. The successful internationalised higher education institute has a balance of national and international students, amongst other things. However, globalisation puts pressure on the HE providers to increase their internationalisation, but the internationalisation of the HE is part and parcel of globalisation (Knight 2008).

Internationalisation of higher education and its concepts are further revisited by De Wit, Facel-Avila, Knight (2005) when they specifically question the arena within which the concept of internationalisation takes place, and that this cannot be detached from the environment within which it operates. Their work looks at internationalisation in different Latin American countries and the impact of different agendas and policies. They establish parameters in their understanding of internationalisation and these parameters deals with the difficulties that exist in decoupling the idea of the globalisation of education from that of the internationalisation of education (p6). The increased provision of private institutions in Brazil (p.117), at the time of writing, reflects the increasing shift from public to private in many countries throughout the world. Moreover, this increasing reliance on different stakeholders that, for example, co-produce reports and focus also on the marketing of Higher Education for International students, such as GATE in Germany (Calagan 2019, Hale 2019, Heublein et al 2014) substantiates the De Wit, Facel-Avila and Knight's argument about the increasing pressure to internationalise. Furthermore, their 2005 report showed the increased demand for internationalisation to be the result of mixed intentions, from governing bodies wanting to improve the education, but also in order to attract through being more alluring. In order to support the process of internationalisation states support different approaches to internationalisation and different internationalisation structures. De Wit, Facel-Avila, Knight's work analyses the increasing role of brands, rankings etc, that aim at attracting international students and staff to the respective countries. Their research also substantiated the global challenges of privatisation within and between the HEIs.

Defining internationalisation (Altbach Knight 2005, Knight 2018) remains an issue. The lack of a common definition encouraged Knight (2018) to break down the university into three different types – the "*Classic, Satellite, Co-founded*" (Knight 2018). By establishing three different types it allows for a greater understanding of the type of internationalisation that occurs, and that the models can be used to understand the type of internationalisation that this work analyses. All of the aforementioned models are comprised of various types of categories and conditions upon which the institutions function. All of which in turn deal with the more

contemporary hurdles that the HEI has to manage – whether it be linguistical hurdles, financial challenges, academic cultures, quality assurance or diversity (Knight p.114-116).

2.3 International discussions about international students

International students are difficult to group or to define because of their diverse motivations and their diverse social, cultural, linguistical, geographical and migratory backgrounds. One theme that is addressed in understanding international students, is their linguistical capabilities to study and succeed, and how the different migratory backgrounds[13] impact on the international students' capabilities. Andrade (2006) reviewed studies addressing the adjustment factors and linguistical differences of non-English and English-speaking international students in countries from Canada to Australia. The work identified various studies and analysed support systems that were established and how they contributed to the students' success and satisfaction with having been an international student. However, Andrade also identified research that provided inconclusive results about international students with a particular migratory background and their abilities to group work. Also, how the established institutional mechanisms (linguistical support networks) contributed to the ability of the international student, and that the positive contributions of international students are underestimated and that their role does not receive sufficient support. The results of Andrade's work highlight that the biggest hurdle facing international students are the stereotypes aligned to particular groups of international students, and yet again Andrade's work also identifies that contact to the native student improves their capabilities and integration, but that contact to the native students is not always so easy. Their success and sense of satisfaction is in part a consequence of their academic experience and not necessarily their social experience.

2.4 International students as global students

Understanding why international students want to become international students, globalisation, and the global student, is the centrepiece of the work by Killick (2012) who focuses on the student in its new community, and how this community develops and addresses the recognition of students' citizenship[14]. Killick carried out several in-depth interviews with international students, working on the concept of the global student (p.372-374), and the

[13] Migratory background refers to the immigration to Germany from another country and that the person has a citizenship other than German (Will, 2019).
[14] Complexities of the term citizenship and the rights of citizenships are beyond this work, but for a more extensive understanding Kochenov(2018).

development of the global student remains a consequence of self-reflection, also through the interaction with others in their curricular and extra-curricular activities. Killick develops the idea of the global student and their experiences as one that is not specifically related to the host country but one that is related to the other cultural experiences that the student ascertains through interaction with other-like- students. The commonality amongst a diverse group of students can then be their internationality as opposed to them being nationals, their sense of belonging is belonging to the internationals, to being an international. The research from the perspective of the student was increasingly the theme of research concerning the international students in the USA (Araujo 2011, Ardrade 2006, Boyer and Sedlacek 1987, Constantine et al 2005, Tinto 2012).

2.5 Student Success

> "*In Germany, stakeholders have some degree of consensus on what they regard as study success - all of them seeing it as 'the successful completion of an academic degree', but this so far did not result in a broadly agreed definition as at the same time there is also a shared and strong critique with regard to the indicators used to measure study success. This contrasts to the case of England. In both countries however, there is agreement that improving the quality of teaching is the key to improving study success*." (European Commission report 2015 p74)

2.5.1 Student success in general

The US is home to one of the most established higher education researchers of student development, departure, and success in higher education. Vincent Tinto began with the theme of student departure and has been researching higher education and the students' passage in higher education since the 1970s. His focus of student development also addresses student dropout, retention, and progression, whereby his theory of integration was developed in 1993. The usage of the different terms adds to the challenges in assessing the students' developmental path. As Hagedorn (2005) so succinctly points out in defining the difference that an institution retains and a person persists, and retention rates may be from the first to the second year, but this can also be varied, as with attrition which is the reduction of student numbers from one year to the next. Much of the literature concerning student success invariably directly or indirectly refers to Tinto's work for its simplicity, validity, and applicability. Because his work is pivotal to research concerning student success but also deals with student departure, this

section of the work looks at Tinto's contribution to student success and will also include his references to student departure. The US higher education system is quite different to the German system, but US research, also because of its use of Tinto's theory of integration, can contribute to the discussions to understand international students' success rates in Germany's higher education.

Tinto's main theme regarding higher education and the ability to complete education pivots around the theme of integration. Integration is pivotal in both testing and confirming the ability of the student to persist and the HEI to retain, and with his integration, the onus is not limited to one actor, but as the term suggests, integrationist. The issue of accountability has underlined most of Tinto's work. In his 1973 work on dropout, Tinto (2012) explained his model, and the application of institutional and individual factors were explored in conjunction with persistence and discontinuation, and departure. Later, Tinto's work on integration showed that the individual's motivation was a factor in many studies that coincided but also in some cases outweighed integration. This emerges in more recent literature that addressed the social pressures to be involved or integrated with extra-curricular activities or conforming to expected behaviour which is non-conducive to student success (alcohol consumption to name but a few), and not conducive to graduating.

Tinto (2012) used a mixed-methods approach, Tinto contributed and researched the importance of the classroom and that it is underestimated regarding students' persistence. By comparing students in a coordinated atmosphere of learning in both the quantitative and qualitative analysis, it could be ascertained how this contributed positively to the persistence of students. Tinto (1973, 2012, 2017) highlights the need for further analysis into what actually happens in the classroom in order to improve retention rates. Tinto subdivided this aspect into 4 factors: "curricular, pedagogical, grading, and assessment practice." (Tinto 2006 pp7). Tinto discusses the importance of the classroom as a medium in creating a space for integration. Integration can be encouraged through motivation and motivation varies whether through interacting with others in the classroom, or connecting with the HEIs employees, which can contribute to enhancing the ability of the student to stay on and succeed (Chickering Gamson 1987, Tinto 2005).

Tinto (2012) pursued several perspectives including that of support. Financial means and how some institutions may support the students based on "need" rather than "merit" is considered. The 2012 work was to aggregate research that has been done into how institutions can maximise their potential and refocus on the classroom as the one place where students can learn to excel and succeed. How they can succeed depends on so many factors, however, Tinto

reiterates that the classroom is so often ignored as the epicentre of being a student. Students have multiple functioning roles and are not necessarily residents or from well-to-do backgrounds, or that they can focus all their time on their studies. Therefore, the necessity of getting it right in the classroom in the initial semester is quintessential to developing an environment and a focal point that facilitates students to succeed, and so that the HEI could retain the students in their choice of programme. The work contributed to many aspects of what can be done by all stakeholders in contributing to student success. The classroom could arguably be nurturing grounds for motivation.

The research also focused on other aspects and dealt with the issue of "accountability" (p.149) questioning many defining assessments that are laid forth. Particularly, because it is taken for granted that the time to completion is 3-year for a 2-year course and 6-years for a 4-year course. This raises the question of how accountable are HEIs when they depict a course as being two years, yet it is accepted as de facto that the two-year courses need three years for completion. With regards to the American system of two and four-year college completion rates, the question was posed as to which of the two types of institutions contributes to helping more. Tinto highlighted that there are students, and they have more challenges, yet persevere to succeed in the two-year colleges, in comparison to institutions that may have a greater number of students that are better off, and/or have fewer factors that hinder their ability to complete a degree within a certain time. Tinto also cautions about the data that feeds into accountability analysis. Many factors are missing that are necessary for understanding the institution's attempt at accountability. HEIs want to contribute to society and are striving to be accountable and support their students to persist. Tinto questions the mode of assessment and that the expected/actual graduation rates and regional comparisons provide for best practice (p.150/151) for their results are based upon the data that feed into the system.

To differentiate between those students that transfer, Tinto (2012) also explains that students that move around amongst different institutions to gain sufficient credits for their course have been defined as swirling. However, Tinto warns about when analysing transfer students and including these results in graduation rates as something that is "fraught with complexities" (Tinto 2012 p.149). Furthermore, measuring "expected [and] actual" (p.150) rates of graduation with a variety of input variables and regressing what graduation rates should result from the invested variables (mentoring staff, programmes etc) in comparison to other institutions, and then the rates as they actually are caters for different perspectives and a more rounded approach. Thereby the institution can see if it has a "positive" effect on graduation or not (p.150).

A number of reference points are of interest, one of which is the development of two web pages such as the Education Trust[15] which provides a platform for comparative analysis amongst institutions. Whilst the conceptualisation of accountability between institutions is debatable, Tinto maintains that the concept of accountability of the same institution over time is an indication of the institutions' success, in particular, because of how the students' progress from first to the second year over time.

2.5.1.1.1 Different perceptions of student success

Tinto was also concerned with whether there was a decrease in differences of students from the first to the second year over time. Therefore, the HEIs' programmes retention rates, although not defined as such, are pertinent to Tinto's work about student success. However, there have been other criticisms about individual forms of measurement because certain universities were only using their Winter Semester registrations for their calculations.

American research (Soldner et al 2016) presented cases where HEIs were producing their success rates using a theoretically more competitive cohort to carry out the calculation and hence showing how better rates could be presented. For example, if that calculation is based on a course with winter and summer semester registrations, the winter registrations may be students that have qualified for the course and are those that qualified based on a competitive entrance qualification or NC[16], and hence, excluding success rates based on summer applicants. This reduces the measurement to a particular type and cohort of the HEI's programme. The success rate results of this form of measurement were very good – all those students that received rejections for the winter semester were removed from the equation, and the summer cohorts were not included in their success rates, this meant their definition of the student was based on the competitive and successful applicants that passed the high hurdle in the application of a student place in the winter semester limited spaces in these elite HEIs.

The transparency was missing. The point being that the winter admissions were made of students that gained entrance in a competitive application procedure. Thus, the respective students that qualified for admission to the more competitive winter semester were considered more ambitious and in general had better results in comparison to those who entered in the summer semester, where the requirements were dropped, and the students were admitted based on their application rather than their application and better aptitude. The argument was that if a

[15] https://edtrust.org/ provides an array of information focusing on equity and on the functionality of higher education.
[16] NC numerus clausus or restricted entrance based on grades in final secondary school exams.

HE admits in winter and summer but only uses the winter registered students to calculate their success rates, then these results were selected and that the method skews the results. Wolf-Wendel, Ward and Kinzie (2009) addressed "accountability" (p.407). The importance herewith is in recapturing the basis for understanding the involvement theories, in that it points out the relevance of the environment and how the student relates to the environment. Wolf et al reiterated a shortcoming of analyses, if for example, limitations are set based on norms, then outliers are missed and misunderstood. In such a case, the winter semester students are considered the norm and the summer semester are the outliers and removed from the equation.

2.5.1.1.2 Historical development of academic research surrounding student success

Understanding the perspective of student success which was stressed by Tinto (2012) also deserves using other disciplinary approaches. Student success, from a historical perspective, involves many disciplines, Johnes (1993) traces the roots to that of the Economics of Education, in particular to the works of Schulz in a 1961 lecture in the USA. The basis of such was the contribution of education to economics from the perspective of human capital (Johnes 1993, Becker 1992). However, limiting the concept of student success to human capital ignores other forms of capital in society. Conversely, the lack of education is aligned with areas that are depleted of prosperity on a political and socio-economical scale, this can be traced back to the writings and works of Durkheim (Durkheim 1976), upon which Tinto's theory was further developed. Tinto (2012) highlighted that accepting students and retaining students cannot be disconnected from the mission of the HEI and that the term dropout shifts the focus to the individual whereby the type of departure that happens needs to be addressed by institutions. In his research Tinto (2012) stresses the importance of research aiming beyond academia and that it must also be relevant for policymakers, and that cross-sectional studies often present the snapshot in time results which may have a limiting understanding of the different types of departure, such as voluntary or involuntary departure. Tinto also emphasises that institutional measures cannot prevent all types of departure but by only focusing on dropout the institution is removed from its role in the action of departure.

2.5.2 International students in the USA

International students that choose to study in the USA, are in a system that is very different to the German system in that the native language is different, and the educational

system is very costly for the student, and international students' study fees alone provide a high source of income for the state. The USA has been one of the most frequented destinations for international students. The USA is an attractive destination for international students that wish to improve their English language proficiency and better equip themselves for the global labour market (Araujo 2011). The proficiency of a language that is not the native language was the focus of research in the USA (ibid). The USA has long been pioneer in their research of higher education and the internationalisation thereof. Particular studies focusing on the flow of international students include the works of Hechanova-Alampay, Beehr, Christiansen, & Van H (2002) that compare international and national "student sojourners" (p. 458) and the levels and strain that they experienced. In their longitudinal work with a sample nearing 300 international and domestic students, they could identify a greater level of strain amongst the international students in comparison to the native students. Their work aimed at also identifying how to predict strain amongst international students and concluded that "self-efficacy [and] social support" (Hechanova-Alampay et al 2002 p. 472) play a crucial role in the strain experienced among both the international and domestic students, and are more prevalent amongst the international students due to the lack of support network availed of.

Further work (Constantine et al 2005) analysed cultural differences and race, such that black African international students from Nigeria, Ghana and Kenya come from societies where they are of a similar race to those in their home country. Racial discrimination is one factor that they had not pre-empted or experienced and it has had a negative impact on their experience as an international student in the USA (Constantine et al 2005). Apart from other aspects such as the difference in climate and the isolation that these international students experience, the results of the research also showed that the international students were in further despair due to lack of their otherwise present support and the extreme inequality that they witnessed, and inequality that was racially biased which they experienced in their short stay in the USA. All of which added to their decoupling of themselves from the surrounding cultures.

The perspective according to which international students are understood contributed to a shift in the research of international students in the US (Araujo 2011). Understanding their difficulties, and research that addresses these adjustment factors showed that language proficiency and feelings of self-worth also contributed to the mental well-being of the international students and that the weaker linguistical proficiency was related to a subjective feeling of having limited support from the support services. Furthermore, having a more diverse network of other cultures including links with the US culture reduced stress-related aspects of the international student. However, international students were found to have limited interaction

with US students. Yet those international students that were in the US longer or had returned to the US showed greater cultural acclimatisation than those with a shorter period of time in the US. Hence, different cultural migratory backgrounds and the history thereof differently influenced the international students' ability to overcome cultural difficulties that they encountered.

Further research suggests that the US practices linguistical discrimination which inhibits the social integration of international students with a foreign language, such that even the accent of the international student can act as a barrier (Lacina 2002) and this can also result in loneliness and isolation amongst and of the international students.

2.5.3 International students Retention and Attrition in the USA

The importance of understanding how to retain international students is considered as being more effective and sustainable than attracting international student (Boyer and Sedlacek, 1987). Researching predictors to identify what predicts persistence resulted in their report concluding that "feeling confident, determined and independent, and having another individual to whom to turn in crisis, were important determinants of adjustment to academic demands and attainment of academic success" (Boyer and Sedlacek 1987 p.11). The study was the follow up to work in minority groups of students in the US and also took factors of racial awareness and social engagement into the analysis. Other factors of self-confidence, motivation and a positive appreciation of their scholastic surrounding and support person when in need, were identified as predictors. The hurdles of financial strains were recognised as contributing to difficulties in persistence. However, the imperatives of persistence were stressed in an attempt to increase retention of this important body of the student demography.

Adelmann (1992) puts forth the idea of using the American community college to assess how society actually is, and that the role of the HEI, in making shorter programmes of education possible for those who might not be able to carry out the four-year degrees. This conceptual understanding was further researched by Pascerella and Terenzini (2005). They delved into the comparisons and defined persistence as "*the progressive re-enrolment in college, whether continuous from term to the next or temporarily interrupted and then resumed*." (p.374). The authors identified that there was a greater chance of persistence in entering a four-year degree programme as opposed to the shorter two-year programmes. Much of the work analysed whether there were differences in persistence amongst those students who undertook a two-year programme and then transferred to a four-year programme, and the duration or the time

they needed to complete their study programme, in comparison to those who only attended the four-year Baccalaurette programme.

What was identified is that the two-year programme played an important role as an intermediary or steppingstone process in becoming an undergraduate (p.376). The research continued to identify that a postponement of matriculation in higher education is one of "seven" factors that contribute to being a risk for the student in not persisting and completing their degree. In conjunction, the "*stopping out*" (p.382) is identified as increasing the risk of prolonging the time needed for completion and non-completion. When comparing the public and private institutions, the private topped the public in the completion, persistence, and duration of the degree. However, in persistence per se, the difference between private and public was less than ten percentage points (p.385). The comparative success may however be relative to (Adelmann 1992) other factors of these institutions (e.g., size). However, that said, the authors also reiterated that size was identified and countered as factors impacting on educational success, and for many ethnic groups, it was not significant in its workings. Dealing with persistence from first to second-year study is pivotal to understanding the introduction of "*University 101*" (p.400), a programme that reached out to those students who might be at risk. This began almost 40 years ago, it has seeped into most programmes in the US higher education, for either all newly matriculated students or the majority, reaching out to those at risk. The results show that its application has a positive effect on persistence (p.402). *T*hey also analysed studies that were carried out on the impact of *"work*" (2016 p.82) on higher education. They concluded, that although initially employment was used as a control variable and that an ever-increasing number of students will be enrolled in some form of employment.

Mesidor and Sly (2016) presented their work in the *Journal of International Students* relating resilience of the international students to success. The work addressed how international students have adjustment factors that may negatively impact on their ability to study and that these stress factors are prevailent but could be avoided through both students and HEIs availing of services that should be on campus.

Ohland et al (2008*)* reviewed persistence amongst engineering students, and the levels of migration into engineering. They compared not just influx but also output in comparing engineering to other fields of study. In their study, they concluded that the influx into engineering was comparatively low. Their analysis was based on a dataset of engineering students, thus specifically established to track the route of those who matriculate in engineering. Ohland et al (2008) identified a number of pointers, amongst which were that engineering

students have comparatively lower numbers of in-migration in comparison to other fields of study but have similar levels of persistence from those who initially matriculate.

Apart from the lack of female presence, the demographics of engineering are similar to those of the other fields of study in Ohland's work. Additionally, Ohland's research substantiates that of Tinto's research in terms of engagement. Here, however, Ohland pointed out that engagement was as high, but where engagement is low, disengagement is quicker "all students become more disengaged over time, but non-persisters disengage more quickly" (Ohland et al 2008 p.262). Santiago and Hensel (2012) in *Engineering Attrition and University Retention* focus on the attrition in engineering students and identify several factors that counter the results of Ohland's et al study on attrition. What Santiago and Hensel's use are the "*suspended"* (p.1) students, those who have discontinued their studies, whether they begin again later is partly analysed.

2.5.4 International students in Australia

Australia's is a popular destination for international students, and the numbers of international students that choose to study there have been on the increase over the recent decades, such that in 2007 25% of the student body were international students (Thi 2008). Although the Australian higher education system is not comparable to the German system also because of the sheer costs incurred by international students, and the role international students play in building the education export economy (Thi 2008), the research can lend to a better understanding of what factors contribute to attracting international students and facilitating them to succeed. Further research lends insight into migration patterns (Mazzarol and Soutar 2002) and the changing institutional attitude of the role of international students for the HEI and their environment. Mazzarol and Soutar's (2002) analyse the push and pull factors that influence international students' choice to study abroad and the choice of host countries. The Australian report reflects on issues like the status of the sending country, and how the developmental status of sending and receiving countries influences where the student chooses to expand on its internationalisation. The impact of internationalisation and the geo-political relationship of the host to the student, such as colonial relationship is also relayed. The division of push and pull factors range from the initial choice made to study abroad being considered as a push factor, to a variety of pull factors that include the reputation of the country, the quality of their education and the institution regarding know-how, the reputation of the qualification

from the host country, technical information, and positive references from other persons about the chosen institution (alumni, meaning those who have succeeded etc).

Their study focused on (under)graduate students from Taiwan, Indonesia, and China, with questionnaires that were carried out in the field in the students' native language with the aim of identifying reasons for their choice of location. Grouping factors such as the recognition of the host country's qualifications and its high standard are some of the reasons to be found for the students' choice of study. The function of alumni was more prevalent as a factor in decision making in Indonesia as opposed to India, Taiwan, and China. In another study Mazzarol (1998) also analysed the importance of factors such as the success of Institutes on an international arena, in the latter research the focus was marketing and successful marketing of the institution, thereby a combination of push and pull factors. Since the study was carried out, there have been migratory shifts, and higher educational strongholds are undergoing a change (Thi 2008).

Mutual participation by international students' and their lecturers was researched in economics and education students (Thi 2008) in an attempt to address difficulties faced by Australia's international students, and approaches used by lecturers to work with the students as a symbiotic progressive movement. The research results presented that such repositioning remained at the individual and not at the institutional level, but that the Chinese and Vietnamese students often are perceived as being limited or having deficits. These international students concur with what they hope is expected by the lecturer in order to gain appraisal, approval, and acceptance that facilitates interaction, and whereby they gain a sense of not being isolated. By changing the position of the international student from a commodity to having a contribution to make to the internationalisation process the students would be reassuring the continual improvement of the education of which they are a part.

2.5.5 International students Retention and Attrition in Australia

Godrey et al analysed Who leaves and who stays? *Retention and attrition in engineering education (*2015) in Australia in the form of a programme to identify factors to help counter their high attrition rates (over 50% attrition) in engineering. In their study, with a method with mixed sample attainment, the authors also reviewed the attrition amongst non-national students and found that the attrition rates in the first year were higher in international students in comparison to national students, but that this reversed after a longer period of time. However, they also highlighted that there was a preference for the nationals to opt for the five-year degree programme, in comparison to the non-national students who opted for the four-year degree

programme (p.32). Additionally, Godrey et al (2015) highlighted that those students who entered with a more mature knowledge level for engineering education were less likely to contribute to the attrition rate. Godrey et al concluded that their greater "c*ommitment*" (p.32) was a factor in the pursuance of their degree, also in a comparably shorter, or at least concise timeframe, and that this group of pre-educated engineering students also did not switch to a "*non-engineering degree*" (p.32). Although the sample used was small, it reported the differences and extent of the preparedness of students for their course, and whether it counters attrition or merely postpones attrition. One contribution in their conclusion is the identification of students who are potentially at risk of leaving the programme with what can be described as a flagging procedure. In Kettles (2005) work on the international student in Australia's higher educational institutions, the use of discursiveness was addressed to analyse international students' success. Both the role of the student and the staff were analysed, and it was concluded that both agents are important in the process of success, and how this has the potential to transform the students' perspective and the perspective of the student as an agent. This enabled Kettle to conclude that the construct is a responsibility of student and the HEI alike, and that empowerment was crucial in the students' role of not conceding to the difficulties of not being an active participant. The role of this in success is that it contributes to the international student being able to position their role as one that is a part of the university's success. The analysis shifted the focus to the ability of the student to succeed, rather than focussing of the deficit of the student within the realms of the university and from the perspective of the university.

2.5.6 International students in the UK

The UK is another attractive destination for the international student, as it too provides a place for international students who also wish to improve their English language skills. For those international students where English is not their first language, improving their linguistical ability improves their position as a global player. However, research on students' integration is reported to be related to their linguistical ability and "*adequate English is one of the biggest barriers to international students' success"* (Wright and Schartner 2013 p.115). The study referred to intercultural abilities of the international students to integrate with their host environments, in order to test the role of language proficiency. The research of one-year postgraduate international students also identified loneliness as a factor amongst the international students, which in turn was also accompanied by conflictual behaviour, because the international students wanted to integrate with host / native English speakers but also found

it simply easier to communicate with those of similar culture and language. These inhibitions further slowed down their proficiency and added to the frustration experienced and impact that this had on their ability. However, this research was based on a one-year programme which is relatively short in providing international students with the time to integrate. Here, the different experiences by the different cultures showed that international students encountered hurdles based on cultural differences. The research concluded that HEIs should proactively encourage international students to interact with their prospective local environment before their academic sojourn begins and they also suggested greater engagement with their local environment to remove possible experiences of isolation and loneliness.

The stereotyping of international students as being less capable motivated the research carried out on social networks (Montgomery and McDowell 2009) of international students in the UK. Their work identified the importance of the network amongst the international students and that this provided a social structure whereby the international students formed a strong bond with each other. The work highlighted the difficulty faced by students due to what they perceived as misconceptions of culture, specifically pointing out that the UK students' perception of superiority over other cultures neglected to acknowledge that other cultures such as the Chinese culture could make different cultural contributions based alone on its ancient culture. The main result of the research was that the international students formed their own community and that this community was where the social practice developed and formed its structures and networks that provided reciprocal support by, for and of the international students. Therefore, enhancing the international experience to one where the students' internationalisation became more expansive through the variety of nationalities rather than through the lack of integration with the local students. The authors emphasised that there is a dearth in understanding the structural processes that can enhance international students' experience and that it does not have to be limited to integrating with the local surroundings.

2.5.7 International students and Retention in the UK

Higher Education in the UK is expensive, and in choosing to study in the UK the international student expects a high-quality qualification – if they graduate. A Times Higher Education report (Zuccollo 2016) saw an increase in the ability of the UK HEIs to retain the international student. Retention, or rather attrition had become a bone of contention due to high attrition rates during the noughties, whereby the numbers of international were much lower than the domestic student. However, because of the contribution that international students' fees

make to the respective institutions, losing those students after the first year became a costly loss for all. Therefore, actions were taken on behalf of the institutions to increase the retention rates which according to the report are now similar to those of the domestic students. In the UK roughly 20% of the student body are international students – or up until 2020. To what extent that will be maintained post-Brexit, and as a result of covid induced changing norms remains to be seen.

Student engagement as being relevant to success has formed the basis for the work of Liz Thomas' (2002, 2017) work. Internationally, or specifically in this case, the UK with their Higher Education support funds, which includes the What Works 2 by Liz Thomas (2017) have produced a joint work from various universities looking at Student Attainment in Higher Education. The purpose of the book was to address the growing disparities in universities despite or because of the growing variety of groups now accessing universities. Attainment was not the initial point of the book, but rather the social differences of students in light of the varying complexities that have contributed to the face of contemporary higher education. Such factors as the "*neo-liberal*" (p.1) ethics contribution to contemporary higher education, emerged as a theme and challenge to higher education on an international level.

Li, et al (2010) compared the Chinese and non-Chinese international students in the UK and their academic ability. The report's choice of comparisons was based on the large number of Chinese students that emigrate to study also in the UK. Their research identified predictors, whereby the importance of positive performance from the perspective of the Chinese students' family emerged along with proficiency in the English language as important in identifying factors for the students' success.

Following through on the completion rates of students (Weko 2004) and comparing the US and UK completion rates based on available national data sets was a task that looked at the potential of encouraging completion through appeasing the grants taken out by students to complete their programmes. The US was deemed to have less successful, i.e., lower success rates, and Weko reviewed the plausibility of applying the process that is used in the UK to the US. UK completion rates have an impact on the funding that the HEIs become and are included in understanding the HEI's output and production rates. In order to study, many students in both the UK and the US were involved in paid employment. In the UK, full-time students reported a mean of 11 hours per week. In the US, the average hours of those students who worked were 21 hours. However, Weko identified that the policies encouraging completion in the UK were not new policies and that the higher completion rates amongst the UK's full-time students were

a result of a system that had been constantly investing in its public establishments as opposed to the US with its poorly funded systems.

US STEM uptake and completion rates in bachelor's degrees were the focus of Chen and Weko's (2009) report that looked at the US. The research sought to identify reasons why the US is not attracting students to study STEM subjects. The focus of the study was also a result of a demand in the US labour market for STEM students. The study looked at students over a six-year period, in particular, the four-year Bachelor programmes starting in 1996. Taking three points in time, their analysis was able to conclude that the completion rates differed according to types of students, and this impacted on the completion of their four-year study programme. They also concluded that a greater increase of interest in computer science programmes is reflective of the immediate and growing needs of the contemporary labour market and that there remains a differential discriminatory effect in the ability of minority groups to complete their respective study programmes.

2.5.8 International students in the Netherlands

The Netherlands has long put an emphasis on the importance of internationalisation in higher education (Kouwenaar 2015, 2020). As a neighbouring country to Germany and early member of the Bologna Declaration (Hackl 2001), the Netherlands research of international students' and their ability to succeed is relevant as it also researches the role of languages for the international students, the percentage of courses that are offered through English as opposed to or in addition to their native tongue in the Netherlands. Rienties et al (2011) analysed five business institutions in the Netherlands comparing international and national students' success, with the aid of two different questionnaires and a sample of just over 900. The reason for the research was to analyse and deduce how they could increase on the comparatively low number of international students that choose to study in the Netherlands. Of those that do choose the Netherlands, business management/studies are the fields that attracts most international students. Therefore, the choice of research is to gain best practice experience through Rienties et al's study and transfer this knowledge to other disciplines in the hope of improving other disciplines' awareness about factors that can help toward increasing international students' presence in the Netherlands. The study aimed at measuring the success of integration and the impact of that on the success of the student in terms of grades and ECT points attained. The student success was measured using the ECT total and also the average grade at the end of the second semester (Rienties 2011 p692). The results showed, amongst others, that the non-

western group, had greater difficulties in social integration but were on par with all three other groups (The Netherlands, Western, Western-Mixed) regarding academic integration. Here the different international students' cultures were a form of differentiation and isolation.

The transition that international students' go through is the focus of Rienties and Jindal-Snape (2016) approach. Taking different forms of transition, their work analyses different policies in different situations and identified different international students' and their transitions. The results showed the contribution and essence of reliance on international students and how the HEI could and should provide platforms or networks that support the student in their reliance on and also in their adaptation to the local socio-cultural environment. Different theoretical approaches were applied to understand the presence of international students in their local environment, and the contribution that that can have in the classroom.

2.5.9 Success in Higher Education and why people choose (not) to study

"*Bok underscores two areas in urgent need of improvement: increasing the percentage of students who graduate from college and improving the quality of undergraduate education." (Roth August 30 2013 para 8).*

The research surrounding student participation in higher education also raises the question about the choice to study and enter tertiary education. This work was published in 2015 by Helbig, Jähnen and Marczuk, used DZHW[17] data spanning beyond a decade up until 2010. The researchers were able to identify factors that influenced the uptake of a study place, or the decision to study. This varied in certain cases according to federal state in Germany, and the reasons for the variation included socio-economic factors, type of school (whether it was a gymnasium or not) and also what the "peers" (p.4) were doing. In their research, those with a non-national background were also discussed, also that Bildungsinländer were more ambitious in wanting to study than the nationals. Gender was also explored as a factor in influencing the numbers of study starters as was the distance to the next HEI and the impact of the socio-economic background in living close to a HEI. Identifying regional factors that influence the decision to start studying and the availability of alternatives, such as apprenticeships were also analysed, showing that a fall-back scenario or plan b for the individual allowed for a luxury in the choice to study or not.

[17] The DZHW is the German Centre for Higher Education and Research.

2.6 International Students within Germany

"One of the most prominent trends we noticed is the importance of getting a job upon graduation as a key driver for student choice. "Future career impact" is the major driver for international students to opt to study in Germany (96%), followed by the reputation of the country (93%), closely followed by the reputation of the institution (92%)." (Calagan 2019 p.4).

Kokentar (1978) carried out a study focusing only on international students in Germany. Kokentar concluded that international students were either a peripheral issue or completely ignored in the corpus "Students". Although there is a great deal on new management in higher education, the issues of international students remained scarcely touched on. In his study, Kokentar analysed those students largely from developing countries who came to Germany and began their study programme straight away in comparison to those who attended the Studienkollege first. The results showed that changing retention rates can be based on multiple factors. It is important also to see the changing situations in the sending countries and that the changing rates are not only a result of the changes in the recipient country – in this case Germany. Varying reasons for studying abroad, and reasons for studying elsewhere or abroad included the availability or chance to study (that subject) (Kotenkar 1978). The analysis also shows that when less international students partook in the preparatory courses ("Studienkollege" (Kotenkar 1978 p.79) that this had an impact on the student's confidence in his/her ability to accomplish the challenging course. Or, at least that the student was under the impression that the course was more challenging for those who did not partake in the preparatory courses. In particular, the reference was for courses that were established in order to prepare the international students linguistically, culturally, academically and for the German institutions for the successful completion of their degree.

However, those international students that did not partake in the preparatory courses and came directly to Germany were less likely to want to change their subjects. In his analysis Kokentar could identify that over 60% of those that had attended the Studienkollege considered that the degree would be beneficial for their home country (p.86), implicating that the students intended on returning home to implement their learnt expertise. Indeed, of those Studienkollege students 67% definitely intended on returning to their home country. Central to the work of Kokentar was the stigma that the students had to deal with and were confronted with from their arrival (border controls, police) to their situation in society. Has much changed since 1978?

On the global scale of things there are many reasons why Germany was and is an attractive place to study: the cost of living is relatively low (depending on location), the cost of studying is nominal. Where students have to pay a fee, the fee is to the student's union and the fee includes registration and a regional bus ticket, leaving the cost of studying, independent of the cost of living, decisively lower than the (registration) fees demanded in other countries.[18] Germany could attract international students, plus the German diplom was a qualification that was esteemed.

Heublein et al 's (2004) used four HEIs in Germany from the late 1990s'to the early noughties to analyse German students and international students that chose to study in Germany and used data to try and identify the sojourn of the international students. Problems such as that of orientation and adjusting to the German academic system were further exacerbated by the lack of contact with both local staff and students in the respective sampled HEIs. Other factors such as the age difference between the international students and the German students were considered to have impacted on the higher dropout rates of the international students: that being the more mature international students were at least two years older than the German students, this difference, at the time of the reporting, meant that those international students were also possibly at a different life-stage, and possibly other responsibilities. Financial difficulties, coupled with working restrictions due to visas, does not necessarily make the employment opportunities easier to attain.

The report by Isserstedts and Schnitzer's 2005 which was funded by the BMBF, followed, and focused also on the results of internationalisation policies and the path of international students in Germany and German students abroad. The report presented demographical developments of the HEIs internationalisation, including policies such as reserving capacity for international students. The majority of international students finance their studying with parental support, personal or familial sources and/or employment. One of the challenges discussed is the varied living standards from which the different international students come, and that internationalisation is embedded within this process of globalisation, which impacts on financing. This led to the question of how the changing market systems can maintain and provide higher education, this is relevant because one of the difficulties faced by students and that presented problems for them and their ability to complete is how they financial could pay for their stay. The work refers to Heublein et al's report in 2004 about the higher tendency of

[18]The next chapter will deal with the fees for international students in Germany, however, here we can state that the average cost for a student to study in the US in 2016 was at least 20.000 USD which is a reason why the US have seen an increase in their students leaving for German shores (Rentmeister 2016).

international students to drop out, a major factor for such is that of insufficient funds, and the report continues, that this predisposes dropout, which could be countered by improvements in support networks on the educational and social arena. The provision of study support programmes and social networks were considered as a bridge that can support international students in their cultural integration.

The report distinguished and grouped students into "*students from developing countries (DC) - students from countries in transition CT) – students from industrial countries (IC)*" (Isserstedt Schnitzer 2005 p.7). Those foreign students who were raised in Germany or have a German matriculation were excluded from their report. The ratio of student starters, when counting all international students, the breakdown was 60% European; 24% Asian; 7% African; and 7 % American (north/south/central). The report also addressed the foreign resident students and highlighted the role of neutralisation as a process that can impact on the figures.

This breakdown recognised the different needs, whereby according to the report the DC-students migrated due to the non-availability of tertiary education programmes in their own country. Fiscal problems often accompanied them on their journey and that their choice of courses was often in English. The second group, CT, included China and old Eastern Bloc countries, where there, too, there was a need for the provision of research programmes. The last group, ICs, has seen a relative decline when the report was produced.

Since then, we have seen a stronghold in the BA/MA ECT programmes. In the 2005 report, it was highlighted that Germany's influx and outflux of students were, like in Japan and France, very balanced, unlike other predominantly hosting countries such as the Anglo-Saxon countries. They identified an increasing tendency of German students to choose to study in Australia. Their report included the self-completion student questionnaires, that were carried out in 2003 on a random sample. The report also mirrored that international students are less likely to choose to study in a Uni of Applied Science- and that they tended to opt for the university programmes. According to their definitive breakdown, students from the transitional countries opt for engineering, as opposed to the other two groups' preference is in fields of study relating to culture.

The choice of study field, and country of origin was also reflected in the report about the duration of study. Furthermore, it broke down the federal state in which they chose to study. It also reported the time foreign students spent studying, and their engagement in employment, and relayed how foreign students spent comparatively less time on their studies, in comparison to their German counterparts. Schnitzer and Isserstedt (2005) also differentiated between what they call "non-mobile" foreign students, that is those students who have attained a German right

to matriculate as opposed to the "mobile" foreign students (p.2). This differentiation then allowed for differentiated development of students from the migratory perspective. There were different choices in study areas based on development status and gender, more females than males from industrialised countries chose arts and humanities, but more males than females from developing countries that came and chose engineering study areas. Furthermore, they reported that around 50% of the international students had already completed a qualification in higher education, roughly a quarter of those were unsatisfied with that qualification[19].

The report noted that in the winter semester of 2002/03 11,7 % of the student body had a foreign citizenship. Of those 8,4% of the student body were international students, if however, we account for all student starters, 13,8% were international students. In comparison, encouraging the international student experience in Germany was guided by goals that were set for 2005 which included that 10% of German students should have attained international educational experience which reflected the importance by countries to increase their students' internationalisation. This goal was reached, and the goal of 20% was on the agenda. Reporting on specific programmes, such as the Fullbright Programme with its post-WWII history of establishing intercultural exchanges through academia, reinforce the long-standing aims of internationalisation within the context of Germany-US exchanges.

The report concluded, however, that the international students in Germany maintained that gaining contact with German students was one of the greatest challenges of their stay. Hence, the report continued to focus on social aspects of internationalisation.

Calagan's report (2019) was an amalgamation of International Student Barometer work with DAAD and the BMBF focused on the question of what makes the international student happy. The work specifically looked at structures that exist and experiences that the students encountered and how the structure supported a sense of happiness, as happiness is also an indication of satisfaction and success. The results present the role of support networks including international centres and in this report an issue that remains of concern is the ability of the international students to make contact with the domestic students. Seeking contact with the native students is an older issue for international students in Germany and can be found in the work of Kokentar (1978).

[19] Considering that the majority of the international students were study starters, but had already completed some form of higher education qualification, it begs theorising that their experience in higher education equips them with motivation, a factor that contributes to student success (Tinto 2012).

2.6.1 The German approach to understanding student success

Although awareness about the international research is of importance and critical to analysing what are the present hurdles regarding student success, it is also imperative to review what is done on a national level. The Deutsche Zentrum für Hochschulforschung und Wissenschaft (DZHW) (Ebert and Heublein 2017, Heublein et al 2010; Heublein et al 2014; Heublein et al 2004; Heublein and Wolter 2011) has been researching students in higher education on behalf of the German Ministry for Education over the last 20 years. Heublein et al (2012) give a follow up on previous studies, that were also funded by the BMBF, where the student dropout was analysed according to graduation and type of the institute. The approach taken by the DZHW focused on student dropout[20] rather than student success. The study showed a slight decline in the dropout amongst Bachelor students, in the cohorts that were analysed. However, there was a difference in the dropout amongst university students in comparison to the universities of applied science institutions. The difference in fields of study identified that in the various fields of engineering the dropout has dropped but remains above the 30% mark, "*civil engineering's dropout rates have remained unchanged at 51 %*" (Heublein et al 2012 p.4). Heublein et al identified that amongst the graduations, the Masters' presents a programme with a comparatively low dropout rate. Regarding foreign Bachelor students, which were identified as those who received their right to matriculate abroad (not in Germany) dropout was 40%. Likewise, the dropout in Masters' programmes was lower, and in some cases even lower than the German counterparts, here Heublein et al also included the foreigners who qualified to matriculate in Germany. The breakdown of regions was African/east Asian, other Asian, East European, West European, Latin Americans. Heublein et al also analysed the Master students, and whether or not they qualify to be called dropouts, because they have a qualified undergraduate degree which qualified them to uptake a Master programme.

Heublein and Wolter (2011) analysed amongst others, the goals of the Education Department, that by reducing the dropout rate of students in Germany, a step was being taken to compensate the insatiable labour demand that was exacerbated through student dropout. The authors addressed the methods used, reiterating that the best form of analysis would be a true cohort analysis, which unfortunately was not, at the time of the report or at the time of writing, permitted in Germany. The authors compared their DZHW's method with the cohort analysis

[20] The German term is Studienabbruch which literally means breaking up a study, which has been translated to dropout. This is unfortunate, because the focus is on the person rather than the institution or the interaction between the person and the institution (Tinto, 2012).

by the Stadtistische Bundesamt and concluded that there was more precision with their complex analysis. Further, Heublein and Wolter's contribute to the clarity in understanding of dropout and the different groupings that belonged to this through an all-encompassing definition that describes the "loss" (p.215) of student frequencies in the respective grouping to which they belonged. The term "drop out" (p.215) however, belongs to those who begin an (under)graduate programme, and discontinue without a final qualification, this does not encompass those who chose a different programme, the field of study etc. (Heublein and Wolter 2011).

Heublein et al (2009) addressed the issues which included regaining students' interest in engineering. Germany faced and faces another problem– the high number of dropouts amongst engineering students. The research, in the form of self-completion questionnaires, focused on a representative sample of ex-matriculated engineering students in the year 2007/2008 – thereby targeting ex-students to pinpoint the reason and identify factors in their decision to "dropout". Differing between graduate degree and type of HEI deepened the ability of the analyses, which could pinpoint factors ranging from the conditions of the programme, failing grades, and financial aspects to name but a few. The work could further identify that in mechanical engineering, if students' dropped out, it generally happened between the second and third year. They could further pin-point that two factors (cognitive capability and their motivating themselves factored in dropout occurring prior to this (Heublein et al 2009).

The results of the interviews were later discussed with those involved in what could be done to counter this dropout, the topic of presence, interaction, pedagogy and also the conditions for entry were relevant to the analysis and results in varying dropout rates.

Another institution that furthers the work and the understanding of Germany's internationalisation process is the German *Gesellschaft for Higher Education and Research* (GfHF). Since 2006 they have hosted annual conferences researching higher education in general, and their goals include networking amongst researchers of higher education in German-speaking areas[21]. The research areas are multidisciplinary, and with Ulrich Teichler as a founding father, the institution promotes analysis of higher education in general, and of internationalisation of higher education in Germany, to such an extent that it led to the Deutsch-Chinesische Hochschulforum (GfHf 2021)[22]. The sphere ranges from management, but even in the earlier years there were panels presenting work on the internationalisation of higher education, such as the International Educational Market in 2010 (GfHf 2010).

[21] The network positions institutional research in Germany, and have recently opened up an English-track in their annual call for papers.
[22] This is the German-Chinese Higher Education Forum, with its own webpage.

2.6.2 Institutional support for international students in Germany

Rech (2012) developed a model to explain student success of international students who were in Germany to carry out their first degree. The analysis was based on different datasets: the PROFIS-evaluation, Project data surrounding the profiles of HEIs regarding the extent of their internationalisation, and also the Sozialerhebung DSW (Social survey of the German student's body). Rech also used Tinto as a basis for his model, however, his work focused also on the institutional factors that contributed to student success or reduced student dropout. The analysis further identified institutional instruments, and sociological barriers that were encountered by the international students. His work also relied on the results of Heublein et al (2004) and their various publications regarding student dropout rates in general and the recognised tendency of student dropout to be generally higher amongst international students. Rech's data sources covered five different datasets, the point being to ascertain and analyse the success of structural instruments that were also set goals aimed at improving the infrastructure of the HEI. Rech omitted the analyses of the size of the staff because his conclusion was that the number of students is supposed to be a given for the number of staff. The analysis could have accounted for the size of the staff but would not have been able to account for the internationality of the staff, limiting the contribution that the data could then potentially make[23]. One of the other sources of data was the PROFIS data, Rech had previously been involved in carrying out the PROFIS analysis. This provided an insight into the structure and potential that the data could offer. The data is also based on the construct of organisational theory, and Rech discusses mechanisms that contribute to easing the passage toward success for international students. What seemed to be missing, despite the analyses focusing on structures and networks was the explicit analyses of social capital as a contributory factor in increasing the potential for international students and their student success.

Rech's theory about the success of the varying structures that were implemented to facilitate student success included much of the measures that are visible in HEIs: international offices, language courses before and during the study period, and the aims, intended efficacy and lifespan of the projects' products. Including international students from five universities, and carrying out e-assisted interviews, albeit only in the month of June-July 2008 meaning the insight into the efficacy, was also answered by those students who were included in the sample, to what extent there was a bias is speculative.

[23] Internationality of staff in official statistics was first available/ recorded in 2008.

2.6.3 Germany's international students compared to the USA/ Australia

Germany's academic exchange service (DAAD) is a German body that supports internationalisation on many levels. In 2018 they released a report (Kercher 2018) to see how Germany's international success rates, in general, appear to compare with those of Australia, the USA. The report is part of a project that also receives funding from the same line as this work's project, the aim of which was to follow international students from the beginning of their studies through to the end. At the time of writing the DAAD was cooperating on carrying out longitudinal analysis, also using focus groups concerned with the student success of international students. However, considering that the bachelor's degree is six semesters, and if the analysis is limited to a six-semester period, then the longer duration needed by international students will fall short in this three-year planned analysis, perhaps with a prolongation the project can tackle this issue amongst its bachelor students, as the project was not yet completed at the time of writing. However, Kercher was able to identify that according to official data, international students in both the USA and Australia do contribute to better success rates, within certain time frames, than their national colleagues.

2.6.4 Student success and dropout in Mechanical Engineering in Germany

A 2009 HIS[24] report (Heublein et al 2009) included a sample of exmatriculated students in 2007 and aimed at assessing the causes of dropout. The analysis identified that mechanical engineering graduates, as opposed to the dropouts, had successful (higher) school level maths and physics. The research implied that in conjunction with this, if the break between school and HEI is too long, then what was learnt at school, dwindled, increasing the likelihood of dropout. The study also showed that by analysing different types of programmes (bachelor in universities, bachelor at UAS, diplom in universities, diplom UAS, magister[25]) independently both bachelor and diplom, best practice can be attained. For the diplom dropouts, a lack of integration was a contributory factor, in comparison to the bachelor students, that had a more frequent presence through the more compact courses, that lead to greater social integration, which in turn was less of a reason for dropout amongst bachelor students. The discussion about the results concerning selection encountered a mixed reaction concerning the type of knowledge gained in schools. The type of selectivity – covering not necessarily the academic but also the

[24] HIS changed form and became the DZHW in 2013 (DZHW 2020).
[25] The magister is qualification in German higher education that has been discontinued (with few exceptions).

motivational aspects, and the role of industries in also recognising that the school grade and the best grade in graduate engineering is not necessarily the best suited to particular industries.

Technically orientated programmes wanted to work closer to solve technical deficits in society and create greater solving problem courses (Klöpping, et al., 2017). From which there emerged Acatech which are an amalgamation of German universities and technical universities that focus on issues and higher educational factors that through joint action and collaboration could be addressed. The purpose of the organisation, in a 2017 report, was to gain from best practice experience, confront issues challenging the TUs, and contribute to a better understanding of the academic, education and political changing societal and labour market needs. Aiming, also, at improving this very particular branch of education in Germany was a part of their strategy. The organisation has produced multiple contributions, through amalgamating its resources: and the Acatech Study on Student Dropout in Mechanical Engineering that was published in 2017 is one such example. Their research included a report on student departure in their institutions, including engineering fields of study. Their results were less pessimistic than the results presented in Heublein et al's analysis on student dropout in STEM subjects. The results of the study "Study dropout in Mechanical Engineering" in 2017, is based on the template of research that was carried out in 2013 (Scherfer 2013). [26] The acatech and DZHW reports presented two quite different sets of results: Heublein's 2017 report presented a dropout rate of 31% for mechanical engineering but in a study field with a dropout rate of 48%. Acatechs report with mechanical engineering dropout rates as low as 20% (2017). However, the acatech report states that the approaches taken by both the DZHW and acatech cannot be compared, because of the different sample but they specifically point out that their method presents a very different picture of student departure, with acatech's approach beginning with a cohort starter as opposed to the DZHWs approach that works with the graduates and a respective starting cohort.

In the 2017 acatech report which analysed student dropout in bachelor's degree programmes in the TU9 universities, and two additional universities (Erlangen-Nürnberg and Duisberg-Essen), one of the universities: TU Dresden is still an enormously proud holder of the Diplom. Dresden was removed from the comparative analysis due to the lack of comparability of the Diplom with the BA, as was Braunschweig, because the data system did not comply, and

[26] The 2013 research used an online questionnaire that was carried out in Stuttgart's University. This template was used to research in the other TU's, however, the study at hand could not be carried out online, why it could not, was not explained. Nor was the actual method of fieldwork explained.

the data was not suitable[27]. Leaving seven TUs, and the two universities, with just more than 50 thousand cases (50171). Whereby the system of tracking was used so that each case is possibly a person in their first, second, third, etc semester. A student could also be represented in the data as partaking in multiple programmes if they had completed their previous programme. However, RWTH in Aachen has a seven-semester programme, which rendered the comparability of its study duration and student success as being difficult. The Acatech Study dealt with first registration in the engineering fields of study including mechanical engineering as a subject, with the starter cohorts 2008/2009, in Bachelor programmes. The study's contribution highlighted the strengths of various programmes, such as the self-assessment tests, and the variability in success rates that emerge. They concluded that HEIs with an NC system and a self-assessment system before application proved to have better rates.

The importance of the acatech report is not just that it produced different results to that of the DZHW, but that it used a different approach. Much of the research in Germany concentrates on student dropout, in accordance with the DZHW method. Different approaches lend to solving the problems by providing for different insights. Destatis house the official student and examination data and reported very general success rates (Destatis 2020), however, there is a report of how these data could be used for measuring success with this expansive source of data (Beck 2007) and for measuring student success rates.

Another approach was taken and also used the official statistics to carry out a cross-cohort analysis of mechanical engineering in Germany HEIs between 1995 to 2015 (Bandorski et al 2019b). The approach analysed individual HEIs that were in the acatech Study (2017). In this case, however, the authors identified the HEIs. This provided a temporal analysis of how the different HEIs success rates in this particular field of study developed over time. In addition to the success rates, their research included retention rates of student in their winter semesters, to assess the ability of the HEI to retain from the first to the third semester, however, because they did not limit themselves to the conventional first-third retention rate measurement, they were able to identify, with these retention rates, the rates of students in the more senior semesters. In doing so, and in conjunction with their success rates, their work identified increasing rates in senior semesters in either bachelor or/ diplom, indicating a movement from one programme to the other. On an institutional level, the research could identify that there was movement between the bachelor and the diplom degree types in both directions, and beyond that, that there

[27] What this work discovered whilst using the Destatis data was that the issue with Braunschweig was not limited to Braunschweig but was connected to an institutional development in the federal state of North-Rhein-Westphalia, between 2008 and 2012.

was movement from the universities to the universities of applied science (Grözinger and McGrory 2020). Their datasets included all groups, German, residents, and international students, and could identify that the movement between the HEIs coincided with the better success rates of the universities of applied science over that of the universities in the sample of bachelor mechanical engineering programmes. Moreover, the approach could address the retention rates, something which Tinto identified as being more telling about the ability of the HEI to accommodate success rates and very different from the approach of dropout rates.

By testing the functionality of the administrative data, the work not only identified that the administrative data could be used to analyse the results of structural changes but also analysed the administrative data's quality. The relevance of using administrative data, a rich source of secondary data, was scrutinized. By identifying the extent of missings within the official data, and proposing a method added to the transparency of measuring success rates the research continued to assess the impact of missings on potential success rates (Bandorski et al 2019b). Hereby, their work created a method that allowed for missing cases to be calculated, and according to which they could present alternative success rates with the missings included. The work showed how varied missing cases are in the administrative dataset, but also despite the missing that the datasets are important sources of institutional development in HEI. For example, work with the data helped identify temporary solutions to administrative tasks such as some of Lower Saxony's universities pooling their resources in the early noughties for registration purposes, and how these methods were tested and then overturned.

2.7 **Concerns with the concept of student dropout**

Unger and Thaler (2014) analysed issues concerning student dropout. Their work surmised the situation in Germany and Austria and concluded that the definition of dropout is precarious as some students are registered in more than one course, and when the student reduced their load from two courses to one course this meant that they had theoretically dropped out of the second course. They had not actually discontinued their studies. The researchers questioned to what extent is the University an interim stopover – as being an inactive student is less negative than an unemployed person. Their work unveiled that the HEI system has students who do not attain any credits in their first semester, and this lack of activity could implicate that they are waiting on employment. Critically the introduction of the BA, that ran parallel to or replaced the Diplom distorted the institutional and subject-based differences when comparing completion of programmes, due to the longer degree courses (Unger and Thaler 2014 p.35). The authors' differentiation of student dropout and student progression definitions identify the

difficulty in comparing and interpreting the figures. The Austrian matriculation number allows for the one student to be followed through regardless of where and when s/he has been matriculated (Unger and Thaler 2014 p.38). Unger and Thaler also concluded that the complexity of understanding dropouts is not alone for the universities but also for the political domain to critically reflect that the stopover in higher education, until a place of work is found, shows that there is need for creating policies surrounding Student Dropout/Transfer and Continuance.

2.7.1 Concerns about how student dropout impacts on employment

Schnepf 's (2014) report analysed whether dropout from tertiary education is negative and whether the idea of human capital accumulation can also be understood, in that by matriculating a certain amount of human capital has been ascertained. Schnepf discussed removing the stigma associated with dropout and identifying that it is not necessarily a disadvantage to society. Dropouts contribute through their job acquisition to society, and this needs a greater understanding. The work also addressed the fact that there is a need to focus more on higher education policy in particular, in how we deal with the concept of dropout. The negative association of dropout has been reinforced in certain countries such as the UK where dropouts induce payment by the HEI. Schnepf identifies the labour market's "credentialism" (Schnepf 2014 p.13) as the main explanation of dropping out of tertiary education. Schnepf identifies that in HEIs with an NC system of admission to HEIs there is a lower dropout rate. Also, student dropouts from parents with a low socio-economic background is higher in countries such as the UK and Italy as opposed to Scandinavian countries, the consequences of the type of welfare that exists and how it impacts on the likelihood of dropping out is another avenue that was highlighted and that resulted from the research as not being sufficiently explored. Gender-based differences explained that males drop out more often than females. Schnepf concluded, in her analysis, that dropout from tertiary education had a better score in employment than without tertiary education, thus dismissing the idea of wasting human capital through dropping out. However, her sample was based on those 20 years and older, and by excluding younger students she removed those younger starters in those countries, and starting at an earlier age is a norm, and that they possibly contribute to a larger percentage of those that drop out.

2.7.2 Concerns about student dropout and stigma

In a report by Davies and Elias (2003) they used postal self-completion interviews and telephone interviews over two years to review the employment status of the non-completers. Their results were less optimistic than Schnepfs' in that a higher percentage of non-completers were in low "status" employment positions. Directly after dropping out only 6% are unemployed, and that this dropped to 3% one year later. The perspective of the report was from the labour market and the status of jobs attained and attainable. Therefore, also focuses on the idea of human capital and that the less time spent in higher education the lower the status of the employment. However, it should also be borne in mind that this report was in the late 1990s, the employment sector has changed in content and status. Additionally, in the report they highlighted those reasons for dropout included their own lack of knowledge about course content, this was, however, just one of the factors mentioned. Davies and Elias point out that in analysing the results, it must also be borne in mind that the sample included only 10% response to the postal self-completion interviews, and thereby a certain bias exists. However, they maintained that the results reflect the population. Davies and Elias refer to the negative impact of stigma on non-completers, and that the value of their employability is less than that of graduates. This international difference, where "it is better not to start than not to complete" in comparison to the work from Thaler and Unger (2014) and Schnepf (2014) who question the contribution that matriculation alone makes toward employability. Schnepf's review of employability is more positive in comparison to that of the stigmatised and lower value perspective of the English-based report. Davies and Elias reported a lack of consultation opportunities or communication with any member of the HEIs as a factor that played a role in dropping out of the HEI. The report substantiated the work of Vossensteyn et al (2015) who also analysed that paid employment beyond a particular number of employment hours per week increases the likelihood of the student discontinuing their studies. This, however, indicates that the students were in employment before/whilst dropping out, which may also reflect on why unemployment was 6% and not higher.

2.8 International Higher Education Policy

Hackl (2001) focused on the conflict of interests between maintaining national policies for primary and secondary schools, and the harmonisation in higher education through the Bologna Process and the European Area of Higher Education. The conflict of interests and constant resistance is evident through national Governments protecting the nation's educational

policies from intervention by European policies. This divergence of national policies protecting primary, and post-primary education from the harmonisation policies in higher education, centre around employment.

Hackl (2001) highlighted two factors that influenced the increase of students in the 1960s and 1970s, as not just a societal demand for more equal opportunities, but also the increasing demand for employees with an adequate level of knowledge to meet the ever-increasing needs of an ever more technologically advanced society: therefore, creating employees with adequate knowledge for employment. This transforms the role of higher education, to not being a public good, but rather an "individual rates of return" (Hackl 2001 p.4). Hackl lends insight into the changing structure of Higher education in Germany. The role of the Bologna Process in Germany has not just had major structural changes but also extensive demands from external parties.

Sievers in 2008, discussed how the Bologna Process has also been perceived as a process that converted the role of Higher educational institutes to professional institutes (Sievers 2008). This professionalisation of the higher education impacts upon institutes in such a way that it provokes questioning if this form of professionalisation actually negates the European Union's strive for social cohesion. Sievers (2008) substantiated Hackl's arguments and equates the Bologna Process development to a storm that will cause havoc to the German higher education system.

2.9 **International students and their contribution to society**

Student success has long been connected with forms of interaction, and how students experience their lives beyond that of the classroom (Pace 1984). These forms of interaction, both on and off-campus are considered important for the successful development of the student, as they imply that interaction and involvement are factors of their student life. The cultural diversity that exists within the urban areas was one that was perceived to feed and support the civicness of rural areas (Jacobs 2000, Florida 2014, McWilliams 2018). In the late 1990's a wave of literature ran parallel to developments within society that questioned the decline of "civic engagement" (Bowman 2011 p.30). Civic engagement and involvement in our societies, and their institutions are based on multiple factors, including demographic developments such as urbanisation, or how rural areas are used to serve different functions. The international students provide for heterogeneity in our urbanities, and this means that "structural diversity does not directly yield educational benefits, but it serves to increase the opportunities for interactions with diverse peers to occur" (Bowman 2011 p.32). The international students are

or become these "diverse peers" (ibid). Part of that success is and remains the perception by the surrounding society of the "international" students, and their role and contribution to the environment, or their ability to integrate and their ability to engage in a civic environment – this can range from anything such as adding to local linguistical diversity[28] to voting in whatever election they are allowed to. Bowman continued that "*college students who engage in diversity experiences may become more aware of issues of differences, inequality, and/or discrimination [] which could lead to greater importance placed on personal involvement in civic action".* (Bowman 2011 p.35).

For the differences that international students bring to German HEIs are not just the differences per se (Hurtado 2001, Hurtado et al., 2017) but differences in cultures and nationalities within the realms of academia. Their contributions are also about the content and perspectives of the modules that are used, applied, and developed to provide for a global student. This in turn can provide the HEI environment with a society that is not just spurned through its "internationals", but through the interaction and integration that can contribute to a more diverse society.

The international students' motivation to succeed and their positive contribution to society is of political relevance, also because they are per se, diversity. Their diversity as a part of the cultural and knowledge society becomes a part of the political society. Hence, the political relevance of international students in Germany is such that the success of the international student in Germany may entice the student to stay on and work in Germany. If tertiary education is a door opener to the middle class (Selingo 2015), then the demographics of the middle class would then become more heterogeneous and diverse. By creating opportunities for reducing inequality through education and by having a more diverse demographical makeup, Germany's HEIs are facilitating a diverse community to be on equal pegging. Therefore, the political relevance of international students' success rates is not merely limited to the fulfilling of policy goals and increasing the number of students and those who graduate. The political relevance if far more wide-reaching, the relevance is having international students and they can indeed contribute to improving universal political relationships.

Hurtado (2001, 2017) researched the international students and their success and the diversity within HEIs. The scope of the research ranges from the lack of diversity in HEIs, the

[28] The potential that the linguistical diversity with international students sometimes manifests itself in private language schools where the international students work to support their studies, and in some cases develop into their own companies. This provision, of linguistical and cultural experience, could be used in primary and secondary schools, where international students could share their home-based experiences, and share them with pupils.

contribution that diversity makes to society, and the creation of policies to increase the diversity in the HEI. All of which focus more on the diverse cultures and socio-economic backgrounds in the HEIs, and in some fields, in particular the STEM fields (Hurtado et al 2017). Although the work looks less at the internationalisation per se it does lean on the contribution of international students to the interactive culture that can have a positive contribution on societal needs.

Deardorff (2006) brings intercultural competency back into the international arena by addressing the need for a common definition, and that because this is failing, the opportunity of internationalisation ignores the importance of intercultural knowledge. Deardorff's research presented a mixed-method approach with a sample including different actors in the HEIs. Their conclusion preferred a broader definition of cultural knowledge. The research was in part motivated in order to decouple an understanding of outcome and output so that HEIs could understand how far their HEI was in terms of the internationalisation process, and what part of the process reflects their position.

However, as HEIs are expanding the increasing numbers of students means increasing work diversification of work for those working for the HEIs. The general increase of students means increased financial[29] demands on the HEI so that all students – national and international have equal opportunities to succeed. Increased students could and theoretically should well mean increased diversity (Rubin et al 2014). The hurdles facing HEIs are challenging, for they have to ensure that those who matriculate have the support that they need and ideally ensure that they can continue their courses. On the other hand, the HEIs have to ensure that they maintain their quality, and that this pressure to perform, does not implicate that HEIs should grant degrees or diminish their quality (Blume 2014).

The HEIs are open to diversity (EHEA 2020) however "[…] in emphasising the positives of cultural diversity but without acknowledging the realities of how oppressive discrimination can be – that is, it rightly values diversity but without paying adequate attention to the realities of adversity for those people subjected to unfair discrimination." (Thompsen 2006). Therefore, policies concerning cultural diversity in the various HEIs either directly or indirectly and intentional or unintentional impact on diversity (Rubin et al 2014), because the international students add to the diversity of the HEI, and as the sending countries vary (Knight 2008) reaching out to this group of students is complex. International students' diversity means the ability to "perpetuation" (King 2010 p.28) and in Germany's HEIs that shows to what extent

[29] The German HEIs run on state, government, and third-party funding. More third-party funding means more money for the HEIs and labour that support research, teaching and mentoring at the university.

the HEIs are successfully ensuring that their students, regardless of their citizenship, can accomplish an (under)graduate degree (BPB 2019) and therefore function to meet the needs of the diverse culture on and off-campus.

2.10 Inter(national) Students and student loans

According to a Yale report (Chamie 2018) Germany is one of 40 countries with free of charge public education. It must be noted that free of charge refers to the cost of tuition and excludes fees for registration, as is the case in Ireland[30]. The growth of students and of international students is also a factor that has an impact on the demographic changes, in part because of the accumulated debt that the students have. The massive expense of tertiary education in countries such as the UK, the US, Canada, and Australia is going to impact on human choices (Altbach Knight 2007, Chamie 2018) and probably explains some of the reasons as to why people stay in work so long so as to repay student loans. However, Chamie states that the average German loan, after completion, is around 2,500 USD. The political implications are also reflective of political attitude. So long as the Governments believe that they need to attract students for their ability to be potential labour (Russell 2011), then the status quo may be maintained, should however this attitude change, whether based on fact or fiction, then the possibility of the reintroduction of student fees is something that cannot be ignored. Whilst many students emigrate because their native country may not financially be able to provide tertiary education, or particular fields of education (Kokentar 1978), the changing patterns of international students' demographics is also reflective in the changing ability and norms of varying countries to provide attractive fields of study (Kokentar 1978, Russell 2011). Furthermore, as the international student is often recognised for the contribution that it makes to the host HEI and its region, it is worth stressing that "Most of the world's more than 2 million international students are self-funded, that is, they and their families pay for their own academic work. Students are therefore the largest source of funds for international education – not governments, academic institutions, or philanthropies." (Altbach Knight 2007 p.294).

2.11 International Students' tuition fees

For many, higher education is a luxury, and *internationalisation* espouses esteem. The international students are motivated to move from a culture of learning that they are familiar

[30] In Ireland students have to pay for registering in a Higher Ed programme, which can range from 3000€ per annum depending upon course and institution. (MWK 2021). The actual cost of the course/tuition fees remains free-of-charge.

with to a knowledge culture that may be vastly different to their experiences to date (Badke, 2003, Deardorff 2006). Encouraging tertiary education in order to provide ever more people with an educational qualification that offers more possibilities in seeking labour, is not just about the economics of providing for the labour market, but also about providing opportunities to be on an equal footing regardless of, or despite your social background. Countering the disadvantages within society through the removal of fees for higher education and the provision of funds or grants is one method that is used to support students in higher education. It supports students in their choice to study (Glockner 2009). Organisations such as the DAAD[31] provide funds for German students to study abroad, thereby supporting German students in building networks in foreign territories. In effect, these students act also as diplomats for Germany. Moreover, the DAAD offers funds for international students in Germany. The social responsibility of funds support students in their attainment of education that without these funds, they would not be able to afford. For example, the EU's support of Erasmus programmes facilitates students to travel and access international experience that they would otherwise not be able to afford.

The 'free' tertiary tuition in German higher education coupled with Germany's recognition in the labour market are both pull factors for Germany over the attractive UK or the USA, and possibly push factors if these conditions are not available in their home countries. However, Baden-Württemburg, a state in the south-west of Germany, has introduced a policy where the international students have to pay fees[32]. The introduction of fees for international students outside of the EU is justified by the Baden-Württemburg state under the auspices that all the other countries are doing it too, but unlike the other countries Baden-Württemburg is demanding nominal fees. Furthermore, the fees in the country of origin are (possibly) much higher than the fees being demanded by the state of Baden-Württemburg. By introducing fees, the state of Baden-Württemburg is starting a process, of fees for international students, that other federal states misguidedly might follow (Grözinger 2017), for the advantages of having international students outweigh the costs (DAAD 2014). The financial win for society, based on expenditures by the international student in Germany contribute not just to direct financial gains through the purchasing of produce, but also to gaining labour for employment with the demand for labour that is supplied by the international students.

[31] The DAAD have a webpage devoted to types of funding available for International students (DAAD 2021).

[32] Baden-Württemburg introduced what they described as a nominal fee for non-EU international students – 1,500€p.a.. There are exemptions to the fee for example, in some cases it may be only second degrees and not the undergraduate degree. The reason for the fee was based on the high increase of international students over the course of the last number of years. (MWK, 2021).

According to the webpage, the cost of tuition in other states ranges from the time of introduction: 2006 in Denmark with fees of up to €16,000, or Austria who introduced fees in 2009 for roughly €1,500; The Netherlands demand up to €20,000 from non-EU internationals, Ireland up to €10,000, and England around €20,000 (MWK Baden-Wuerttemberg 2021). All per annum. Granted, these costs vary according to the programme of study, whether it is an undergraduate or postgraduate degree course, and the field of study contributes to the cost variability. However, the introduction of fees for non-EU members means that the social contribution by these hosting countries is reduced to the education of the elite (MWK Baden-Wuerttemberg 2021). Or at the very least reinforcing the inequalities based on socio-economic backgrounds.

The process and decision in Baden-Württemburg about what countries have to pay a fee is dependent upon a means-tested analysis, i.e., that students from the poorest countries do not have to pay fees regardless of whether they could or not. That means that the countries are means-tested as to whether they are deemed financially capable of having fee-paying students or not. The idea is to demand fees, in particular for Master programmes. However, it is possible that these are from students that would possibly be paying even more in their own home country (MWK Baden-Wuerttemberg 2021). The process was ironically countered by the CHE[33], an organisation that actually would prefer to see the introduction of fees in a blanket manner. Their argument being those selective fee-paying mechanisms are usually ineffective and with regards to costs, counter-productive, as analysing and assessing who should and who should not pay fees is time-consuming and labour intensive, and the contribution that it actually makes is then negligible.

Moreover, formal education qualifications provide betterment chances for all, they have always been a means to overcome inequality (Teichler 2007). Education is provided so that it can help people to attain qualifications and jobs, the idea being that through education, we have greater access to employment, and more choices in what type of employment we can do, and this (theoretically) reduces the level of inequality. More people with similar levels of post-secondary education mean that more people have equal access to similar levels of employment and therefore less inequality. Higher education is considered worth aspiring towards because it raises the opportunities of income and raises the chances of a higher income (OECD 2019).

The cost, however, of studying is not merely the actual fees but also the time that the students are out of the labour market. The basic bachelor's degree is accredited with the

[33] CHE (Centre for Higher Education) focussing on German and European Higher Education systems, the assess developments and have a ranking system.

equivalent of 30 hours of work per week (Schulmeister 2014). This means if a student is studying there is not a lot of time left in the day for them to be in paid labour. This absence from the labour market is important because students may decide to embark on a study programme by calculating how long they are out of the market, or when they can start to pay back the costs, they incurred for studying. So, if we see that the cost of students studying in Germany is nominal – nominal being around 250€ per semester for their course – and that they are only out of the labour market for three years, why are there not more students, in particular international students coming to Germany? Is it a lack of success amongst international students in Germany? Low success rates of international student can also result if the students cannot complete in the assigned time, and need longer to complete their programme than anticipated, consequently endanger their funding entitlements (Massey et al 2003).

Therefore, researching international student success is also pertinent to the HEI and to society in general – according to the UNESCO, in 1996 there were 1.949.854 (UNESCO 2018) estimated international mobile students in the world. By 2017, according to the same source, the global number of internationally mobile students had risen to an estimated 5.085.159. It also means temporal comparisons. Such as analysing the situation in Germany now and two decades ago, because the infrastructures and HEIs will have developed over time. This should also mean, that qualified students raise the standard of their situation wherever they live. That the then qualified international student is a qualified immigrant, that can contribute to increasing the well-being of this group within society, diversifying the local population, and the population in general.

2.12 Financial support and study duration

As the work will compare German and international students, it is worth reviewing grant schemes in Germany. International students are not excluded from the granting procedure, but there are restrictions. Glockner (2009) avails of the SOEP data from 1984 to 2007 to look at the effect of student aid on the duration of the study time and success/ or dropping out. The aid that is referred to is the German grant schemes (Bafög), as opposed to students who receive private support. Glockner used the SOEP data to research also the more structured BA programmes with their given structure, in comparison to the Diplom, where it was left to the students' own discretion how many points they acquired per semester. The end result of her analysis was that an increasing amount of student aid in fact contributed to a greater number of students persisting and actually graduating from tertiary education. In addition, it showed that over 80 per cent of those students who had the upper limit of a state sponsored grant, completed their programmes

by the 16th semester, whereas of those who were recipients of private financing only 45 per cent completed in the same time scale (Glockner 2009 p.). Glockner summarizes that the greater constraint in the BA programmes is a possible contributing factor to drop out, in comparison to that of the diplom programmes.

Heineck et al (2006) reported and researched the impact of fees on students who may transfer or dropout of their study programme, using the Student Statistics from Konstanz's university as a source of research. Using a "Duration Analysis "(p.6) they were able to follow the duration of the students in Germany relative to their subjects and the introduction of fees. They furthered their analysis with regressing to see what impact the time and fees have on the duration of study, including issues of transferral and dropping out. Their spread of fields of study resulted in varying results, including that the introduction "*of having to pay a fee in the following semester"* (p.30) increases the "hazard rate" regarding dropping out of studies or transferring to other institutions.

2.13 Social and economic mobility and overcoming systemic inequality

Kerst and Wolter (2017) analysed the diversity of students based on their national and internationality. The authors extracted and analysed students with and without migratory background – amongst which were the international students. In their work they refer to Heublein's analyses about the success rates of international students being lower than those of the German students (p.260). One of the issues that they considered is a simple pull factor and the growing motivation by federal states to improve the process for qualified international students to stay in Germany and work in their area of qualification.

In Greisbeck Heß's analyses, they also dealt with the concept of international students who come to Germany to "study and stay" (Greisbeck Heß 2016). The attraction of mechanical engineering as a study programme and (under)-graduate level is and remains a stronghold of the German Higher Education and as a pull factor for the international students.

The gender (Daempfle 2002, Kerst Walter 2017, Kuh et al 2006, McGrory forthcoming) issue remains relevant and demands continued research and analysis, in particular, if HE providers provide females with "social mobility" (Kerst Walter 2017 p.13) then the changing demographics and diversity within the different fields of study demands further analysis. From their literature, we can learn to probe if attitudes, visible through registrations, may have changed even more so abroad than here in Germany concerning the gender structure of the students participating in the male-dominated (under)graduate degree courses.

There is also a growth in literature on masculinity, one such work in the US on *masculinity and student success in higher education* by Bowman and Filar (2018) tread the slippery ground of needing to understand the societal demands of the male species and masculine behaviour, and the impact that that has on student success. Their analysis was based on the US campus situation, and the potential that the system has to improve and develop. The onset of the book is from acknowledged privilege (xii) that masculinity has to date. The work took the standpoint and topic of the importance of student engagement in and beyond the classroom, and how these impact on student success. They argued that part of the pressure to engage (drinking competitions etc) is part of the reason why male students performed more poorly in their programmes. The importance of the work is to grasp a better understanding of the gravity also of gender conflicts (p.2) and the impact this has on success. The need for the work has also been encouraged because of the (negative) impact that male students' discontinuation has on the HEI, their rankings, and the labour market. One other factor that is mentioned in the book, is that of mental health. With ongoing societal developments – there is a vast array of mental health issues in HEIs which remain ignored. This concentration on the disadvantaged male is by no means an American campus issue, but rather an issue that is challenging for multiple reasons.

Armstrong and Hamilton (2015) explored the role of the HEIs in the US to provide a way toward equality of opportunity. Their work on "How college maintains inequality" shed insight into 'cultural currency' (xiv) which is an issue that could contribute to explaining certain common socially embeddedness factors of class differences amongst different regions. It further contributed to the question of how having international students could counter "social closure" (p.10) through the interaction of students from different social backgrounds and that the reason or purpose that the study programme serves for the international student is for them to achieve their success.

A more recent US report by the Selig Center for Economic Growth (Hill Jeff 2020) presented results that showed an increase in Georgia's GDP by 0,5% if there were a one percent increase in Bachelor graduates. The aim of the report was to reassess the contribution of having a bachelor's degree, to not only the graduate but the economic environment in Georgia, over remaining with a high school diploma. Georgia is reported to be one of a small number of states that does not provide assistance for higher education, and the policy paper is aimed at showing the investment in higher education by far outweighs the costs, and also that there is a sheer need for qualified graduates as the labour market shows that many employment positions remain unfulfilled.

2.14 Migration

"Migration has broken down barriers to understanding, made modernizers of us, taught us to maintain poise in the face of change; to live in two, or even more, worlds at once; to adapt and to move between those milieux in a continual process of change as we strive towards the realization of the human possibilities we share with others. Migration has created regional and local connections far more complex and profound than conventional political relationships." (Higgens 2016 p.47).

2.14.1 International Students and Migration

The concept of international student success cannot be disconnected from migration, for migration is the movement of people and students are people and international students are students that leave one nation and come to another nation, where they register in the university to study, possibly becoming a student for the first time in their lives. Castles et al (2014) reiterate what Massey et al (2005) have said that the percentage of migrants that are present is nominal.[34] Castles et al distinguished between the different African regions and countries, and the role of path dependency, based also on the colonial history in the movement of migrants beyond the Continent of Africa. They also specified that the majority of the movement is within the continent of Africa and that it is only in the more recent past that where living standards have increased, those with the increased living standards and living standard's expectations have migrated. Besides, they highlighted the importance of the feminisation (chapter 8) of migration, which has responded to the lack of carers for the ageing European population.

The feminisation of migration is reflected in the literature in terms of the movement of females from Africa and Asia to the continent of Europe and to Germany's HEIs. Castles et al (2014) also reviewed migrants and the labour market, and in chapter 11 they discussed the role of labour, as opposed to the migrant in terms of "needs" (ibid, p.240) they suggest that the labour migrant should be perceived in terms of "demands" (ibid, p.241). This shifts the theoretical perspective to the type of pull, which arguably changes the type of migrant. The chapter reviews the role of second-generation migrants, – where the children of the migrants have been educated in the respective country. They also used the PISA study to reiterate that

[34] Later in this analysis, the success rates will look at continental regions and countries. In the data, these regions are in part aggregated according to continents, such as the African continent.

although the migrant's children have a better level of education than their parents, their educational attainment is not on par with that of their German colleagues of German parents. They explain that the migrants' children may still be in a lower socio-economic situation with fewer resources that can appease difficulties and that the teenagers that were assessed were "at a substantial disadvantage" (ibid, p.245).

2.14.2 Why Internationals students migrate to their chosen destination

Russell King (2010, 2011, 2012; King Parvati 2012; Gëdeshi King 2020) identifies the student migratory body as one that precedes the migration of skilled labour force (King 2012). Contrary to Rech (2012), King perceives student migration as a subsection of the globalisation process, and Russell in his various works, continues that only the UK and the US are identifiably global players, whereby the data also covers periods of transition including the process of introducing the Bologna programmes into their HEI structures. The attraction of Germany as a host location for the international students was behind that of the UK and the USA.

> "*International student migration is one of the fastest-growing components of global migration. Numbers have risen from 2 million in 2000 to more than 5 million in 2018. Globally, there are certain fairly entrenched patterns of movement. OECD countries host 85 percent of all foreign students, two-thirds of whom are from non-OECD countries, so there is a marked South-North orientation in the global pattern. Three countries (USA, UK and China) host 42 percent of international students, and eight countries (adding Australia, Canada, France, Russia and Germany) host 74 percent. Whilst the pattern of host or receiving countries remains relatively stable, the pattern of sending countries displays a mixture of stability and change*." (Gëdeshi King 2020 p.12).

Elsewhere in Germany, research, using official statistics, could explain the different nationalities of the international students based on the size of the sending country's population, and of that in Germany, and the trade between the countries and the distance (Grözinger 2011). The results showed that methods to explain the presence and density of international students are possible, and also the extent of given factors in the data can lend to this explanation.

Continuing along this line of thought, Bessey (2012) also researched international students migrating to Germany and was able to establish the differences that exist and the

impact of distance on the migratory flow of the students. The research supported the attraction of German HEIs for Asian students as a destination, and that Germany, as a whole, offers multiple HEIs that are well placed in some of the ranking organisations. The increased provision of the complete degree through English is another factor that plays a role, as does the freedom within the sending country, so that countries with little political freedom are less likely to be a sending country. Therefore, the geographical infrastructure and distance, and political make-up are issues that play a role in the international student choosing Germany as a destination. However, the sending countries' GDP did not result in an increase in their students' emigration to Germany[35].

International students' choice of destination is influenced by many factors, one such factor is being aware of the possible destinations, here marketing plays an increasingly important role also in Germany. Heublein (2011) shifted the focus from the international student to the German institutions and researched GATE and marketing instruments as part of the internationalisation concepts in Germany's HEIs. Aiming at 15% international students was the main goal of many of the HEIs, and achieving this goal varied also according to the HEI, their investment in marketing material and their varied aims by what percentage points they should increase the international students' registrations in their institutions. Technical universities and the area of engineering sciences were more engaged in trying to increase their number of international students. A higher percentage of international student registrations in universities over universities of applied science were identified. When the institutes were asked about what makes their institution attractive to the international student, and what they advertise, the factors related to the particular institution – reputation, diversity of programmes, cultural experience – and the brochures excluded or eluded the comparative advantage of studying in Germany over other countries where the cost of studying runs into the thousands. The report showed that the HEIs were more interested in international students from particular regions: Europa, and then Asia, and that the promotion of advertising to attract international students from Africa was not a priority. Indeed, the report suggested that there should be greater emphasis on attracting international students from particular regions such as Europe.

2.14.3 International students' success rates and migration

[35] The publishing date was 2012 but the report was written in 2008.

"*International migration ranks as one of the most important factors in global change*."
(Castles et al 2014 p.7).

International students are migrants (King 2011). Understanding international students' immigration into Germany contributes to understanding the success rates of this group of students. Here the work also leans on the international students in other countries, and despite the differences with the UK it is worth reflecting upon their positioning toward the international students coming into the UK. Migration was a pivotal theme in the UK, and more recently in the several years up to the Brexit referendum in June 2016. Theresa May, then Home Secretary, vowed to reduce the numbers of migrants coming into the country, including the international students. The uncertainty surrounding the rights of international students ensued[36]. In an Ipsos poll taken in the UK in 2011, almost 70% wished to reduce the number of immigrants, however, just under 30% considered international students to be immigrants (Migration Observatory 2020).

Prior to 2015, the migration rates and international migration was considered to be quite steady (Castles et al 2014) however, its role in the political arena would appear to reflect an increase in migration. Internationalisation necessitates addressing the movement of people (Castles et al 2014, Florida 2014, Jacobs 2002, Knox 1998, Massey et al 2005,) and one part of the migration process is that of the international student therefore, this includes understanding international students' choice of where they want to study and live, and likely plan on succeeding in their studies. This begs questioning what factors influence the students' choice of host countries, and if factors of openness and tolerance play a role in their choice of location. Hence, with international students' migration, we are dealing with choice migration rather than forced migration (Castles et al 2014). The concept of migration or immigration, and in this particular piece of research, international student as a migrant also addresses an understanding of the geographical developments such as infrastructural changes and how society differentiates between the different groups through definitions (Castles et al 2014, Florida 2014, Higgens 2016, Massey et al 2003, Massey et al 2009, McWilliams 2018).

The Migration Data Portal's (2020) webpage addresses factors that inform us about international students. For example, it provides a reference of different definitions of international students and the 'international mobile student' according to UNESCO which differentiates the international student from those non-nationals who study in the country. The

[36] At the time of writing the situation as changed that qualified international students may remain in the country for up to two years after their qualification pending employment situations.

clarification is set out between the international student and what they refer to as 'foreign students': those who are *foreigners* in the country where they reside, and the 'credit mobile students' – those taking a semester to study abroad. This work will address and compare the international and German students. The data also provides results about the foreign residents, and that will be addressed in this work.

Infrastructural changes include institutions and policies that aim at increasing Internationalisation of higher education and in this case the migration of international students. Therefore, the infrastructures set the immigration cogwheel in motion. However, the international students remain unobserved in demographic studies (Castles et al 2014 p.7, Gropas 2008, King 2011) yet the role of HEIs and migration are, per se, aspects also of social geography because humans, and their institutions, impact upon their geographical environment, and can help understand the political, economic and social impact on their geographical region. In particular when the goal of the international student is to also qualify that student also for the local labour market. Connecting the international student to migration within a social geographical framework addresses international student migration also because of the demographics of the student population and because this population are a "precursor to skilled migration" (King 2011, p.84). From the socio-geographical perspective, the international student is a migrant by choice, and we identify that the person is motivated to emigrate in order to attain a qualification, a qualification that differs from those who choose not to migrate and were educated in their home country. The ability for students to migrate to other countries and receive a tertiary education qualification also is an opportunity and for each student both motivation and opportunity differ.

This intrinsic motivation is a part of the international students' makeup and if the selection criteria are high this raises the hurdle that the international student must cross in order to achieve a place and register in the HEI. "*The more highly favourably selected are migrants, the more successful will be their adjustment in the destination and the more favourable their impact on the destination economy and society."* (Chiswick 2008 p.65).

The international student as a choice migrant is seeking opportunities. The opportunities may be more accessible abroad than in the sending country – the courses may not exist, the institutions or universities may not exist, or it may be socially unacceptable for the student to choose their study programme in the sending country. Therefore, the international student, through emigration, may also be choosing to overcome disadvantages. The international students then contribute to creating the "World [of] Motion" in tertiary education (Massey et al 2008). The contribution that the international students as a group of immigrants make to the

demography of a region can influence regional prosperity (McWilliams 2018) because the international student's success provides the host country with qualified potential labour and cultural capital. For the sending country, it invariably means diminished labour supply, and brain drain (Knox 1998). If the international student is in employment and sends money back, these remittances are considered important. However, the balance between the loss of a successful international student, which was motivated to emigrate and succeed in a foreign country also means that exactly this type of person is no longer a part of the demographic makeup of the sending country.

Changing migratory patterns amongst international students may be attributed to multiple factors. International students contribute to the migratory sectors of our societies (King Parvati 2013, Massey et al 2005) by having an impact on their environment (McWilliams 2018, Stuart 2016). To learn about international students in Germany we can look at other host countries such as Australia and Canada, that actively compete to not just keep the inbound international student but also increase their attractiveness to other international students, through the provision of political stability and safe environments (Mazzarol Soutar 2002). They assess their progress through mechanisms such as surveying the international students' and their success rates. The relevance of the international students' success lends to understanding that the international student does not necessarily only drain the brain, it also includes brain circulation, qualification-labour mismatch[37] and migratory policies (Castles et al 2014, Drechsler 2008, King 2011, Massey et al 2009). For example, the role may include brain circulation, or brain train (Drechsler 2008, Knight 2018 p.113) hence, also playing a role in Germany's foreign diplomacy. The host country provides a safe environment for the international student[38] (OECD 2019) for learning at a comparatively low cost (with the UK, the USA or Australia). This makes it possible for students to further their education and learn not just their study programme, but also a different culture. The Netherlands has been working on the internationalisation as an integral part of their education system since the 1950s – with constantly working on their present processes and aiming to improve and increase their internationalisation through multiple approaches[39] .

[37] The concept mismatch implies that all those who are educated in a particular area should be employed in a particular area. This reduces the graduate to being a product for the labour market, and presupposes that the students' purpose for studying in a particular field is to be in paid employment in that field. This is disputable.
[38] The importance and relevance of security was raised in the CHER 2019 conference, where many of the student webpages present their environment as "safe" "caring" and "green", and this is presented to attract the international students.
[39] Kouwenaar (2020) in an exchange about the internationalisation since the 1980s.

The 2019 OECD report showed that the number of foreign students has risen. "*In the OECD area, there were 3.7 million international or foreign students in 2017, 6% more than in 2016.*" (OECD 2019 p.229). To what extent is there an increase of female migrants, and are they represented in the same subjects or fields of study as their native female colleagues? Yet again if demographic patterns and developments contribute to the type of society we will have (McWilliams 2018) then the migratory perspective of international students' success rates is relevant for the HEIs and the contemporary and future labour market, for it identifies structural changes such as the feminisation of not just migration, but also fields of study.

Such structural changes with immigration also impact on intercultural learning, which complies with horizontal and vertical internationalisation (Wulk 2016), the impact and consequences go beyond the expectations of the migrant or in this case the international student (Higgens 2016). The international student is important also regarding the intercultural learning through this type of migrant, yet also this role of the international student is often overlooked (King Raghuram 2013). The changing flows surrounding the international students also result from these structural changes such that there are also other countries that are no longer just sending countries but also increasingly a receiving country. Certain trends may be identified according to the changing flows of student migration, and again these impact on the development of future labour migration. The Migration Data Portal (2020) criticises much of the work to date on international students for limiting the analysis to push and pull factors. Furthermore, they extend their critique because the analysis ignores many other issues of concern for and to international students, issues of visas, political stability and instability and areas of work. Also, factors that are of concern to those involved in creating the policies surrounding international students and labour markets necessitate information and much of this is missing (Migration Portal 2020). The Migration Portal that deals with multiple issues of migration, identifies ten leading countries of hosting and sending students – Germany was listed in both cases. [40]

If over 50% of the international students express an interest to stay in Germany (DAAD) upon qualification, they will be contributing to the demographical developments of the (predominantly) urban (McWilliams 2018) areas of abode. Mabogunje (1970) highlighted the importance of job attainment in the process of urbanisation of the migrant, and how this impacts on the cultural aspects and the role of the environment. This can be extended to observing the

[40] According to The Migration Portal there were almost five million mobile students in 2016 – this mobility is all encompassing and deals with different types and definitions of students. The importance of the extent of the mobility, because of its flux, is limited to the income and contribution that international students make to the respective local industries.

changing function of the success of international students in Germany's HEIs, for the international student will then be migrant labour and shape its environment (Goldin Katz 2009).

2.14.4 International Students and the Labour Markets

"*Student migration serves as a precursor to permanent settlement".*

(Massey et al 2009 p.185)

There are varying theories and explanations as to the advantages of higher education for the respective labour markets (Florida 2014, Massey et al 2009, Mellander et al 2014, Möller Tubadji 2008, McWilliams 2018, Porter 2011), one particular approach is how those who feed into the labour market contribute to how this develops a particular type of urban culture such as that proposed in the *Creative Class* (Florida 2014, Mellander et al 2014, Möller Tubadji 2008). Many international students will work their way through college, meaning that they will locate in the urbanities in close proximity to their HEI, this increases the cultural capital of the regions. Reviewing the role of cultural diversity and education and together with labour developments Mellander drew a parallel between the location of the creative class and the location of higher education (Mellandar et al 2014 pos. 2262). And concluded that the level of higher education is not exclusively with second and third degrees but that in the creative core there is a large portion of qualified labour with bachelor's degrees. This creative core is theorised to positively contribute to the labour market developments of the regions[41]. The concept of the creative class includes three particular attributes – tolerance, technology and also talent (Florida 2014, Mellander et al 2014), of which at least the former attributes, tolerance, is important for the international student to be in Germany, and for them to be able to uptake employment so that they can work their way through college (Kokentar 1978). Hereby, we have a theory that distinguishes relation to the labour market as not being the same as the human capital theory, however this is disputed (Möller and Tubadji 2008).

For international students, yet again being able to stay on in their positions necessitate them successfully completing their degree, and for many internationals, their employment must be in the same academic area as their qualification. Thus, understanding international student success in Germany means understanding socio-geographical perspectives that attract international students. Understanding the international student success in bachelor and diplom

[41] Although Florida has quite successfully developed this concept, it has not been without critique due to the lack of empirical evidence to differentiate his theory of the creative class from that of human capital theories (Möller Tubadji 2008).

programmes provides an insight into (primary) degrees and their attainment by international students and the potential that this group can provide in appeasing labour market deficits. This is becoming another hurdle, for the labour market is raising the issues of mismatch which is now on the EHEA's agenda (EHEA 2020).

The importance of addressing student success and including different degree types allows for a look at the impact of structural changes, as depicted by Bok (2017) in the USA. The declining number of those US students registering can be a mix in the cost of studying not matching the employment rewards expected. This mix-match may result in a declining number of natives deciding to embark in huge loans to study and then a) drop out or b) qualify and enter the labour market earning lower income. The potential of understanding the HEIs international students' success rates can lend insight into the type of degrees that the labour market is seeking, and to what extent reports about the lack of qualified labour can be explained when there are also reports claiming that there are many overqualified employees – those working positions for which they did not need their (further) education, and many underqualified in the labour market in positions for which they theoretically require a higher level of qualification. [42] (FAZ 2020). Understanding the HEIs success rates and understanding the local labour market developments, together with temporal perspectives can contribute to a better understanding of the needs of the students in terms of the qualifications that are really needed for the regional market.

The regional relevance of international students is important for they supply the regional labour market with their employment. Therefore, there is a need to differentiate between the international students and the non-nationals who were educated in Germany is that a) the differences between these two groups are clarified, b) the results will show how the different success rates exist and c) that the differences that exist are persistent amongst the non-national students that were educated in Germany, thereby further underlining the social exclusion that has remained persistent amongst this group. According to a report in August 2019 in *Die Welt* "*20,8 million people with migratory background*" (Die Welt, August 2019. O.T) live in Germany. The report continued that there was a slight increase in comparison to the previous year. Of the numbered migrants 13,5 million were not born in Germany, a number of reasons were given for moving to Germany, however higher education and further education accounted for only 5% of the answered reasons form being a migrant in Germany.

[42] In the FAZ (2020) report the claim that there are many overqualified employees was partly explained through the gender difference in these positions.

In the DAAD-Blickpunkt from 2015, the employment of qualified students was addressed. The report set out to analyse the intentions of international students to stay in Germany. It addressed the issues of transition. Indeed, before being a successful international student, the student has to become an international student. That is no easy task, and there are many complications and questions that the students are faced with before and during their decision process of where to study and in deciding to migrate. For those who migrate from within the EU to Germany, there are fewer complications in terms of not having to apply for a visa, the duration of stay, costs of courses, and issues such as health insurance are theoretically covered by their own basic national insurance through the application of the old E111 health insurance cards. Therefore, whether their initial intentions are to stay in Germany and partake in the regional labour markets, is less critical in terms of rights and entitlements to stay. Many countries have access to Germany through special visa agreements. However, many students, in particular Asian students, have difficulties with their visa applications, and job applications. The restrictions regarding the jobs may be to a particular level, or the job must match the qualification of the study programme that the student has undertaken.

Therefore, many students come intending to stay for some work experience and then returning to their home country or travel to other parts of the EU, in accordance with the visa restrictions. The DAAD-Blickpunkt report also highlighted the relevance of placements for those who choose to stay and were employed in Germany. Furthermore, the regional labour markets provide international students with an infrastructure – and with a collection of airports that can be reached from a global network of aviation companies. This facilitates the student in the decision-making process knowing that the regional labour force also is interconnected through the infrastructural network. As banal as it might seem, the accessibility of regions is important in contributing to the likelihood of the labour market, and to the alternatives that are otherwise available through the means of transport and networks. These networks can be identified also through the implementation of international student exchange work programmes so that at early stages, processes are established that facilitate prospective students to know that they can remain and work in the regional labour force. In addition, the relatively low cost of living in Germany[43] in comparison to places like the UK, and the USA make Germany even more of a destination for the student in terms of costs. These are all factors that are not new but are relevant if HEs want to consider their regional capabilities. McWilliams[44] reiterates the

[43] Working with international students in Germany gives me the opportunity of continually asking new students why Germany or why Schleswig-Holstein, the most frequent answer is the comparatively lower overall cost over that of other countries.

importance of such infrastructural factors such as ample accommodation in urban areas and also highlighting that younger generations will not be availing of cars (in Ireland) and that public transport has to be the way forth. The regional relevance of this in connection to the capability of international students to have a comparative success is also implied through the tendency (in Ireland) for the migrants to live in the urban areas. If the international students are supposed to contribute to the regional environment, then continued urbanisation will also necessitate progressive urban renewal policies to accommodate the diversified demography of the region. A DAAD report however related that the majority of the international students, at least when they first move to Germany, seek to live in the assigned dormitories.

The greater the opportunities, the higher the likelihood for employment (Tinto 2012), hence the OECD[45] follow through and research the tertiary level attainment of countries, and they also suggest 40% attainment[46]. From the OECD's 2019 data, a breakdown of the percentage of those with a higher education qualification in the EU countries plus the UK showed that of those aged 25-34 years old, in Italy 27,7 % had a tertiary education qualification, Luxemburg, Lithuania and Ireland topped the list respectively with 55,0% 55,2% and 55,4% The UK had 51,8% and Germany reached 33,3%. The average percentage amongst the EU + UK countries of those within the 25-34 age group bracket with a tertiary education was 44,9%. There are two issues here, first their original aim has been successful if we take this OECD average into consideration. Second, the above lists the percentage of the population with a tertiary education and Germany has an extensive vocational training programme which still attracts a large percentage of the secondary school leavers, these numbers. If tertiary education in Germany does not attract the German students, why would it attract the international students?

2.15 Methods and sources used to measure success rates

Hayward and Hoelscher (2011) reviewed using *Large-Scale Administrative Data Sets to Monitor Progression from Vocational Education and Training into Higher Education in the UK*. By using data sets that had two different purposes their aim was to analyse how using administrative data could help trace student paths, and possibly ameliorate disadvantages

[45] The Organization for Economic Co-operation and Development (OECD) work to help suggest and create policies that will improve the lives of all, by comparing life situations, and governmental investments, the organization is able to compare the social and economic position and suggest research policies that function and can improve lives.

[46] Germany's apprenticeship system is an alternative that supports a strong training based labour force, and its opportunities are overwhelmingly not considered as a part of the formal higher education.

through identifying the disadvantaged. The work looks at the difficulty in accumulating reliable data in order to follow through on an analysis. They noted the biggest problems are the time and costs in recording data, alternatives such as cohort and panels are either with huge temporal gaps or limited in sample size.

In Studying Student Attrition Pascarella (1982) includes several perspectives for an institutional approach. One of those is the work of Pascarella who looks at the choice of variables in measuring student success. Subdividing into categories of "demographic variables" (such as gender, "age, ethnic background, socioeconomic status" married or not, and the "size of the hometown" are included in the list. Lenning (1982) continues with the next category of "Student Academic Factors" that influence and are used in measuring student success. Further to this Lenning looks at what he calls the "initial Student Aspirations and Motivational Variables". This is followed by predictors of "Student Personality and Value Variables". It then moves onto the "Institutional Variables" which include "Prestige, Size, Control" [private], "Type" (depending on the duration of the programme and whether they are coeducational or not. Other factors such" Affiliation", "Selectivity" "Housing" "Student Services" and "Institutional Mission" are incorporated into the analysis. Then Lenning continues with the "Interaction Variables" such as "student ability and college demands" (ibid p.41). Envelopment analysis (Athanassopoulos Shale 1997, Cook et al 2014, Warning 2007) is another procedure and "*is employed in order to obtain quantitative measures of the relative efficiency of the"* university (Athanassopoulos Shale 1997 p.119). However, regarding this method for measuring analyses of HEIs, Warning (2007) states that

"[d]ata Envelopment Analysis (DEA) is the most appropriate and commonly used method for evaluating teaching and research in higher education institutions and provides a productivity measure for each institution that considers the multiple input and multiple outputs associated with higher education." (Warning 2007 p.33).

She continues to align her work with that of Johns (1993), however, Warning's work states that "*The larger the number of graduates as a share of all students, the more successful a university is at teaching*." (Warning 2007 p.52). Warning also used the source of grant, in measuring the research (p.54).

2.15.1 The approach

Regarding the methodology, the division is often given to divide between positivists and interpretivists analysis[47]. Debuschewitz Bujard (2014) argue that the theoretical approach impacts upon the methodological approach which impacts upon the findings. Della-Porta and Keating (2008) reviewed the different positivist and interpretivist approaches, and Keating (2008) explored approaches that were a mix of both interpretivism and positivism, and how this can lead to a richer understanding and ability of the work and its contributions.

This particular work leans on a particular type of data[48] and the analysis that will look at groups, as success rates and retention rates do, and uses this as a basis to understand whether there is an identifiable type of group that is more likely to succeed:

> "*Cultural explanations of social phenomena go directly to the collective level, they are essentially social and, in many respects, (but not quite all) they represent a challenge to methodological individualism. They also seek to bridge external explanation, by reference to the social world, and internalist explanations, which rely on individual interpretation and decision*." (Della-Porta Keating 2008 p.99).

2.16 Interim Summary

In summary, this chapter reviewed literature covering international, interdisciplinary, methodological, historical, and theoretical perspective (Hüther and Krücken 2016) on issues that are relevant to understanding international student success rates in Germany's HEIs. The broad spectrum of perspectives was purposely chosen to allow for an understanding from the point of view of the student and from the viewpoint of the HEI, and all other stakeholders that have an interest in international students' success in Germany's HEIs. Much of the literature

[47] "*Interpretivists (or qualitative researchers in the restricted sense) work more inductively, build up the research question in the course of the research and are prepared to modify the design while the research is in progress. There is thus no clear time distinction between the research design and its implementation, as they are interlinked with continuous feedbacks. Positivists take care to operationalize their concepts and hypotheses in scientific and general terms, while interpretivists let the concepts emerge from the work itself*."(Della-Porta Keating 2008 p.29). This work is postpositivist (Johnson Onwuegbuzie 2004). Although the work is structured according to positivism paradigm with the setting of the hypothesis and the testing, the sample selection was more interpretivist thane positivist, in that the HEIs were selected based on the planned comparison with previous studies and the respective HEIs' ability to contribute, their geographical locations, the demography of the region, the programmes that they had, the duration of their programmes, and by the numbers that were eligible for release from the FDZ.

[48] Castles et al (2014) argue that stock and flow data must not be aggregated, the official statistics are arguably stock data – local students: national and foreign, migrants and international registered in the university at that point in time.

concerning international students, hovers around the USA and Australasia, due to the huge contribution that the international students make to both the USA and Australia's higher education and its GDP (Spraul 2006).

The literature provided insight into the different types of international students, but also literature about being an international student. The internationalisation of higher education, through international students has created a different type of international student: one that experiences internationalisation not necessarily through being in a foreign country, but rather through being with other international students. This is not necessarily the university's desired aim of hosting international students, as host universities continually are in pursuit of the internationalisation at home as a form of internationalisation. However, this is also why there is a continued need to analyse international students and their integration into their host country's environment and culture. This in part, explains the sense of isolation presented in the literature. The impact of such would also help explain why HEIs need to monitor the number of international students, and whether they are retained by their universities, and this is also why there is a need for researching international students' success rates.

Research material based on Germany, tends to tuck the international student near the back of the book – as if they cannot be ignored, but there is not really much that can be said either. Thus, this work will be tucking the German students in at the back, not because there is little to say, but because there is so much that has been said, but little has been compared. The next chapters further develop the role of the international student as an internationaliser, and as a quintessential contributor to their community.

3 The international student as a silent internationaliser[49] and the importance of the international students' success rates

This chapter takes a closer look at the development of the internationalisation strategies, whereby the focus is on the Bologna Process. The demography of the population in Germany, the role of international students' success rates within the context of the demographics in Germany and the relevance of this also for the higher educational landscape are addressed. Furthermore, where the previous chapter presented literature from a broad range of factors that play a role in international students' success rates, this chapter focuses on the contribution of the internationalisation of higher education on a global scale, and on the role of internationalisation in Germany's HEIs also with the view of the potential to the global and regional labour market.

3.1 Internationalisation processes that can support their success rates

> "*A more international approach in the research and teaching of STEM can hopefully lead to not just more ideas but innovative ideas*." (Stifterverband Kleiner 2018 p.3 O.T.)

By addressing the international success rates, we can identify the impact that processes or specific policies have on both national and international students. The ability for the qualified international student to stay in a region often depends upon whether or not the student successfully completed their course, and whether they can then find employment matching their qualification. The importance of the internationalisation strategy means looking at the ability of the HEI's international students to contribute to the success rates and becoming qualified labour. It means assessing the HEIs rates over time. It also means that the internationalisation process involves looking at what role or function the HEI has or has developed with its environment in recent times (Blume 2014), such as implementing policies and structures of a system that should also facilitate the movement of labour. By doing so the HEI is evaluating what processes have contributed to success in terms of graduating international students. It is also about recognising the flows of international students and understanding international students as migrants (Roth 2013). These factors – educational achievement, employment, labour, and immigration, are relevant for attracting the international students, but they are not pivotal to why we need to understand the HEIs success rates. Pivotal is that it has to be possible

[49] I could not find the term internationaliser in a dictionary but found an interesting reference to it in a book about companies (Jones and Dimitratos 2004).

for international students to qualify, and this means constantly analysing their contribution to the success rates of the HEIs. The introduction of the bachelor, through the Bologna Process, is one policy that was supposed to have an impact on internationalisation also through attracting the international students. It was thought that this strategy would reinforce a process of internationalisation that in turn would attract the international student, retain them in the HEIs, graduate them, and maintain the qualified (migrant) labour to Germany.

In the mid-1990s four members of the then EC foresaw the need for qualified labour (Häckl 2001, Teichler 2007). Part of the crux lay in the different types of qualifications and finding a common ground that would allow for mutual recognition. The simplest way to gain mutual recognition would be to create a similar system with similar structures. In 1998 the UK, France, Italy, and Germany signed what was known as the Sorbonne Declaration (EAHE 2020). This developed into what would become commonly known as the Bologna process. The following year 29 signatories supported the aim of the Bologna Process and signed the Bologna Declaration which was an agreement that aimed at reducing the study time and making the qualifications in higher education mutually recognisable (HRK 2020). It also aimed at increasing the percentage of those studying, with the intention that the increased number of students beginning a study programme would mean that there would be an increase also in the number of graduates and therefore increase qualified labour. These factors were introduced also to increase the mobility of qualified labour within the EU and also to have an increased internationalisation and Europeanisation of higher education in what was to become the European Higher Education Area. The internationalisation was and still is also encouraged and supported by the EU[50]. The Bologna signatories grew in number to what is now 48 states[51], remaining independent from the EU but embracing Europeanisation and goals of the EU [52.]

The Europeanisation of Higher Education which led to the establishment of the European Higher Education Area in 2010[53] had new goals. Aiming at 40% higher education qualification in the EU countries remains a goal but varies from country to country, Germany

[50] The European Higher Education Area is an international institution independent of the EU but as many of the members are EU members, and the EHEA's goals are in alignment with the EUs statute, the EU supports the EHEA, and the EU's Commission is also involved in the BP Follow-up group.
[51] The states are: Albania, Andorra, Armenia, Austria, Azerbaijan, Belarus, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Italy, Kazakhstan, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Moldova, Montenegro, Netherlands, North Macedonia, Norway, Poland, Portugal, Romania, Russia, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine, United Kingdom, Vatican City. (EHEA 2020).
[52] http://www.ehea.info/page-full_members.
[53] EU on Higher Education policy maker discussion in Brussels in 2019.

lying somewhere below this goal[54]. However, Germany is still providing higher education mostly free of charge. The goal of internationalisation within the EU countries also aims at (potential) graduates having a minimum of two foreign languages, as a given. The push for languages has a multitude of reasons. For example, it is more efficient, time and cost-saving when multiple agents can find a common platform or language with which they can communicate. In addition, within the EU institutions alone, the time and cost factor involved in translation work is enormous, and the deficit in linguistical abilities is often a major hurdle in communication amongst and between the different agencies. Therefore, within the concept of internationalisation of higher education, the concept of Europeanisation[55] is of importance, for it is also a major funder in supporting HEIs also in Germany[56]. The International students in Germany, are also potential feeders for the labour market within the EU institutions and its labour markets, furthermore the international students bring each HEI system further in its internationalisation process. All of these systems are incorporated and support the development of the more recent and ambitious European University[57] project.

Hence, the EU is responding to the need for research and development aiming at establishing and securing the EU's position on the global market, thereby also placing Europeanisation within internationalisation and that again within globalisation and the process is such that "*Internationalization is changing the world of higher education, and globalization is changing the world of internationaliza*tion." (Knight 2008 p.1). These processes impact on how the HEIs function. For example, the increasing number of courses offered through languages other than German support the goal of multiple linguistical abilities for the international student in Germany and the natives alike. As regards the international students, who are taking a subject of study through the English language, invariably these students avail of the low-cost German language and cultural integration courses that are increasingly on offer in the German HEIs. This equips the international student in Germany with local linguistical ability, thereby removing obstacles that could prevent international students from engaging in the local labour market. Moreover, the provision of this education is creating a framework for

[54] The argument is that Germany's definition separates apprenticeship from tertiary education, and in some other countries they include this group in their quotas (DAAD 2019).
[55] Refers to the at the time of writing 27 countries that are in the EU (see abbreviations).
[56] For reference here one need only review the European Union's webpages for the forms of funding, such as the Jean Monnet Chair, which is only one of many types of funding strategies that provide financial support and awards to contribute to developing Europeanisation of HEIs, in both name and content.
[57] The European University project in 2019 established a list of 114 selected HEIs within the EU that have been awarded this title, of which 12 are German (EHEA 2020).

not just studying but also staying in Germany. This internationalisation strategy meets with the aims of the EAHE, recognising the importance of completion the study programmes.

The opening line on the *Study in Germany* homepage states that "69.2% of International Students Prefer to Stay in Germany After They Finish Their Studies" (Study in Germany Org 2018). However, promoting and encouraging internationalisation takes many forms and strategies, and HEIs constantly seek ways to create and strengthen networks abroad, like that of the European University. One other strategy for internationalisation is the satellite campus abroad.

"*As part of their internationalisation strategy, more institutions are creating offshore satellite campuses or double degrees, changing admission rules for foreign students, revising curricula to encourage teaching in foreign languages, or offering online courses and international internships*." (OECD 2019 p.229).

Although the option of the satellite campus is popular amongst other countries such as the UK, it is not necessarily an advantage for Germany to create the satellite campus abroad. "The coalition agreement signed by the governing parties in 2009 seeks to intensify the internationalisation of German universities and specifically promote the 'export' of educational opportunities." (DAAD 2014 p.2). Therefore, the usage of this subsection of internationalisation of higher education to follow in the paths of Australia and the UK is a step that Germany's higher education portfolio does not want to ignore but must not necessarily follow (DAAD 2014).

> *"In terms of calculating income (tuition fees), the situation of German TNE differs from that of other providers: unlike many Anglo-Saxon and European countries, the German Länder do not charge tuition fees, or only very modest ones, even for foreigners. For the target group of international students, German study courses offered abroad, therefore, compete with studying in Germany itself in terms of costs. Whilst a Chinese student is financially much better off studying on the University of Nottingham's Ningbo Campus in China than at the parent university in the UK, the cost of living and studying in Germany is moderate in comparison. Hence the courses offered by German TNE must provide added value beyond the financial aspects and/or address special target groups and their needs".* (DAAD 2014 p.6)

One other internationalisation strategy is, as mentioned, the double degree. Internationalisation varies in form and double-degrees and joint degrees are forms of internationalisation that can contribute to the international students' success rates. Potential

proximity to a border and how that influences the frequency of international students is also a factor of internationalisation and needs to be addressed (Knight 2008). For example, double degrees exist in various universities for various programmes. So how does the double degree function? The double degree is considered as "two for the price of one" (Knight 2008 p.11), whereby two institutes graduate the students from the institute where that student is registered, in order to be entitled to this award, the student will have partaken in courses from both HEIs. The joint degree was defined by UNESCO as

> "*a higher education qualification issued jointly by at least two or more higher education institutions or jointly by one or more higher education institutions and other awarding bodies, on the basis of a study programme developed and/or provided jointly by the higher education institutions, possibly also in cooperation with other institutions. A joint degree may be issued as a joint diploma in addition to one or more national diplomas, b. a joint diploma issued by the institutions offering the study programme in question without being accompanied by any national diploma c. one or more national diplomas issued officially as the only attestation of the joint qualification in question*." (Council of Europe 2004).

The DAAD actively support double degrees with regular calls for applicants to submit proposals for funding their projects (DAAD 2016) and making it feasible for HEIs to consider having double degrees in their institute. The increasing presence of double degrees in HEIs is alluring to students for it increases their educational value (Knight 2008, 2018), in part this increase in value is through a theoretically more expansive learning.

There are however other strategies and structures that endorse the internationalisation process and contribute to the diverse understanding and type of international universities. The introduction of the *Excellenzinitiativ* is a strategy in Germany that can be traced to 2004 (Sondermann et al 2008). With the aim of restructuring German HEIs, the political intention was to create an internationally competitive HE system and develop academic research on an international level. The initiative aimed also at creating a more attractive employment environment for foreign prestigious academics. To support and establish a competitive HEI environment, funding would be included based on research. This competitive level should facilitate the German HEIs to be comparable with the big-league players such as the Ivy leagues

in the US or the Russell Group universities in the UK[58] and to generally increase the international standing of German Higher Education making it more attractive to international students and academics and encouraging them to migrate to Germany (Sondermann et al 2008). Indeed, this *Excellenzinitiativ* seems to be reborn in the European University project (EU 2021) of which a small number of the German universities are a part. Being a part of the Excellenz Initiative makes the German university potentially more attractive for prestigious academic staff that in turn, make the institution more attractive to the students.

The international attraction can also be seen by reviewing some of the student webpages. According to the webpage Studis-online (StudiesOnline 2019) in January 2019 for subjects such as mechanical engineering alone there were 128 study programmes in Germany offered through English – covering all types of HEIs (public/private etc) and all types of degrees (Dip, BA, BSc, MA, MSc, etc). In business management there were 562 different offers for courses through English, and in economics there were 315 different offers. However, by selecting only those courses without fees then for business management it drops to 294, and of those if only the bachelor courses are selected then there are 209 offers for students who wish to begin their winter semester bachelor's degree in business management courses through English.

Availing of courses through English is without a doubt of huge importance for both the international and GG- students alike. The importance of the provision of courses through English opens up the German higher education system and improves its competitiveness with the Anglo-Saxon educational providers. However, the German higher education can offer more. Although on a global scale, German as a first language of a country may be limited to only a few countries, the interest and stronghold is globally not quite so small. For example, there are over 40 locations worldwide that provide a recognised German secondary school qualification abroad (there are three in Turkey, but otherwise the list by the DAAD implies that each country usually only has one such school). Therefore, it is not surprising that the international students' interest is not exclusively for higher education in Germany through English. However, the question remains to what extent does language play a role in the international students' success rates? Programmes through English allow for greater diversity which has many advantages. Being able to communicate within and beyond the classroom contributes to the ability to integrate.

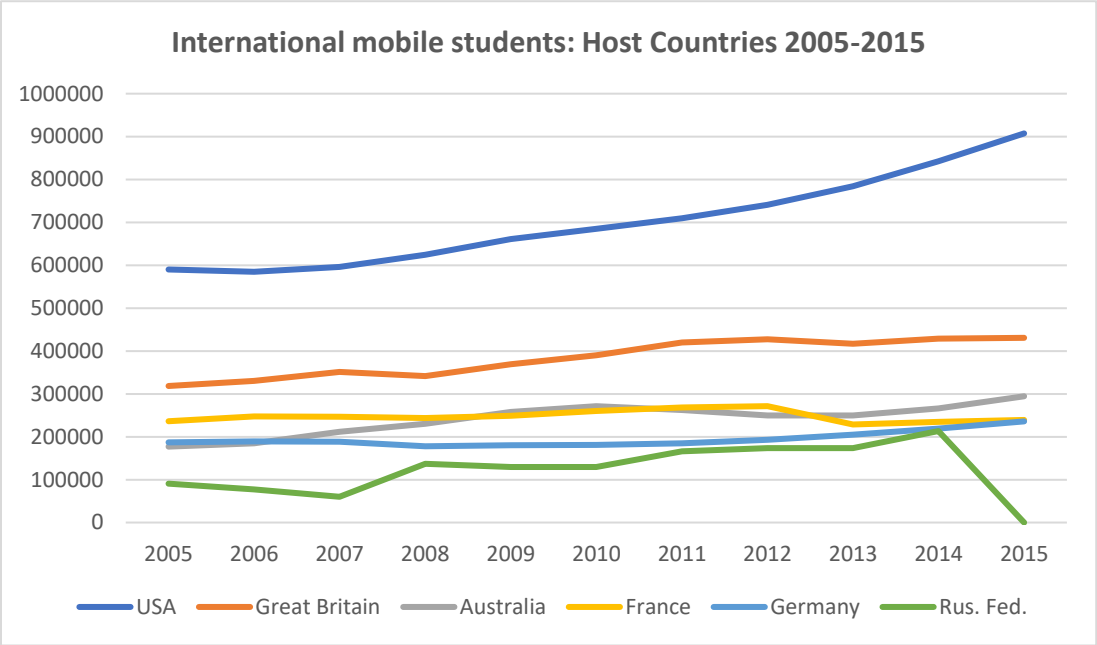
[58] The Ivy League Universities are group of top prestigious universities in the US, created in the 1950s. The Russell Group was created in 1990s, and groups universities that meet excellence in research. The impact of the latter group on UKs HEIs was debated by the SRHE (2018), because of its neo-liberal framework, which will have a negative impact on equal opportunities, or equality of opportunity to accessing such HEIs, and will put immense pressure on staff to produce and create output.

The competition to attract students and to attract international students has varying effects for varying countries, the concentration of international students and their actual numbers will be addressed in the following sections.

3.2 International student numbers

On a global scale, this process might appear to be dominated in the 'Western' countries, which the following graph shows through the relation of internationally mobile students in the various hosting countries from 2005 to 2015. The USA is by and far responsible for hosting the most international students followed by Great Britain, and within the group we can also identify that Germany also holds quite a responsible and respectable position in being a host for international mobile students.

3.2.1.1 *Number of International Students in Host Countries 2005-2015*



Source: DAAD 2019

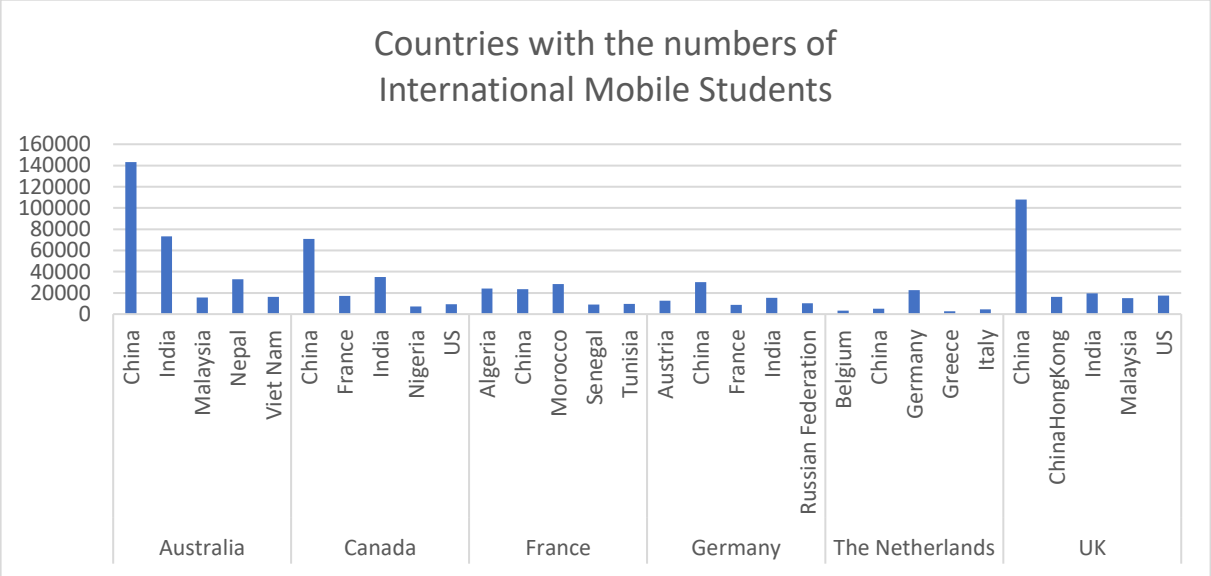
The graph 3.2.1.1. shows the numbers of students in the topmost popular host countries (DAAD 2018). However, it should be noted that the data here are pre-Trump election, and pre (first) Brexit referendum. There are other "players" in the field of successful HE providers for international students, and this will recur throughout the work[59]. Political developments at the time of writing are relevant and de Witt and Hunter (2016) had also commented on the need for

[59] The literature review section also reflected on the growth of "production" from growing providers, such as China's reported growing numbers of international students.

observing the possible change in students' attitudes toward host countries that are less foreigner friendly.

The previous graph reviewed the temporal developments of the number of international students in the respective countries. The following two graphs (3.2.1.2. and 3.2.1.3) are cross-sectional and look at the situation according to the 2020 UNESCO data about where the international mobile students come from and the top countries that they choose to go to.

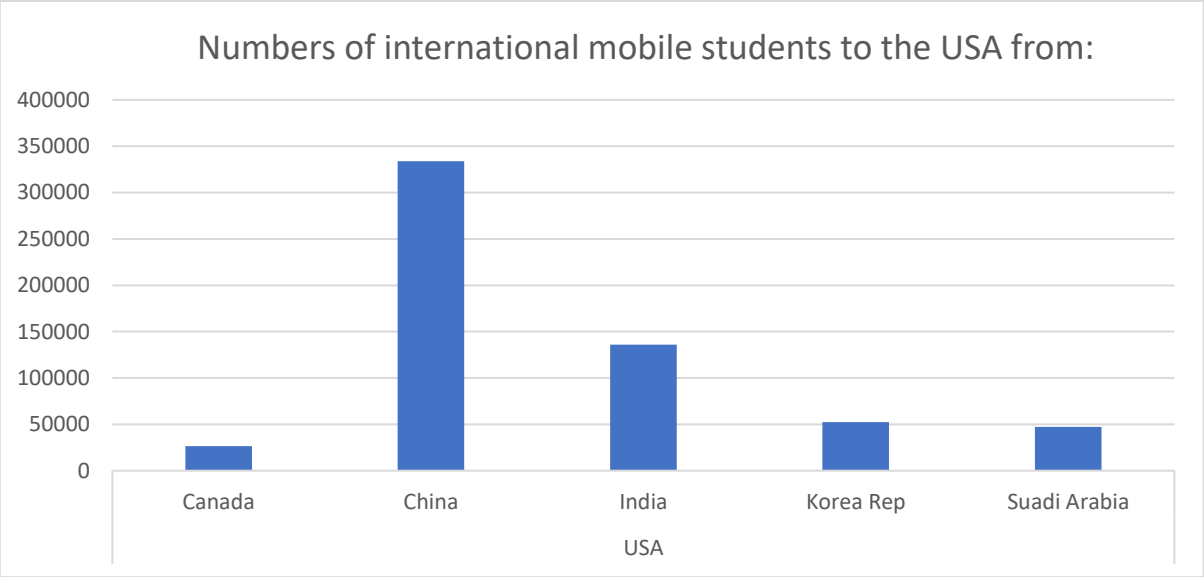
3.2.1.2 *International Mobile Students Destination Country and the top most frequented from countries*



Source: UNESCO (2021)

Due to the large numbers that are attracted to the USA, the second graph singularly graphs the USA alone as opposed to the first of the two graphing the remaining countries (Australia, Canada, France, Germany, The Netherlands, and the UK). The presented countries are based on their large number of international students. Australia, Canada, and the UK are all countries that provide, as a norm, HEI courses through English. All three have predominantly non-EU international students, with the exception of Canada's attraction that draws French students.

3.2.1.3 *International Mobile Students to the USA and the top most frequented from countries*



Source UNESCO (2021)

The other three countries presented attract the following: France attracts North African countries. Both Germany and the Netherlands are host also to EU countries, but Germany attracts Russian Federation students, and the movement in general of Northern African countries may be due to its colonial past, and with it its linguistical history. [60]

According to the UNESCO data almost one million of the international mobile students are from China, they account for almost 20% of the international mobile students. According to the webpage, China itself hosted over 200,000 mobile students[61]. However, considering that there were 33 million undergraduate students in China in 2019 (Wang 2021), 200.000 students is a mere drop in the ocean.

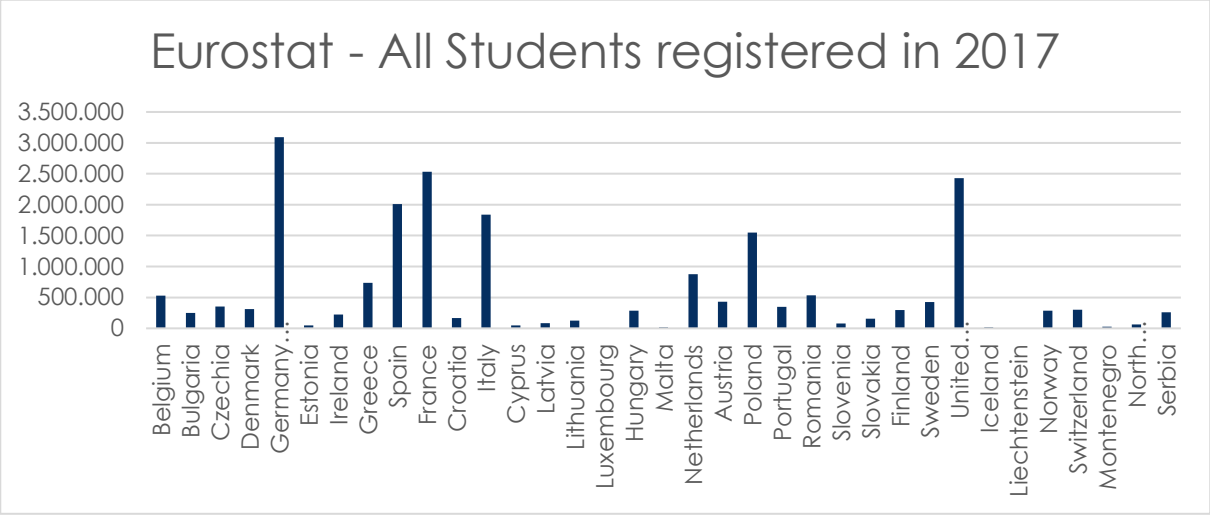
The following two graphs list the total number of a) of students registered in that country in 2017 according to Eurostat and b) international students in Germany according to their country of origin as registered in the winter semester 2017/2018. This provides an overview of the actual numbers of students that the respective country hosts, and it educates, in total, and then the number of international students in Germany. This comparison precedes and paves the way for the German demographics.

The increased number of qualified graduates is part of a strategy and a planned process to supply ample labour in the various fields and follow the goals of the EHEA (EHEA 2020).

[60] The languages spoken in the differs African countries varies (Diercke, 2015).
[61] This differs somewhat from the Studyportal webpage that stated that China had launched a study in China and the campaign aimed at attracting 500,000 international mobile students by 2020, according to the Chinese webpage they had over 450000 international students.

The numbers of students (3.2.1.4), according to Eurostat, from the different countries show that Germany has about three million students registered[62].

3.2.1.4 *Total number of students registered in different countries in Europe (not just EU countries)*



Source: Eurostat (2020)[63]

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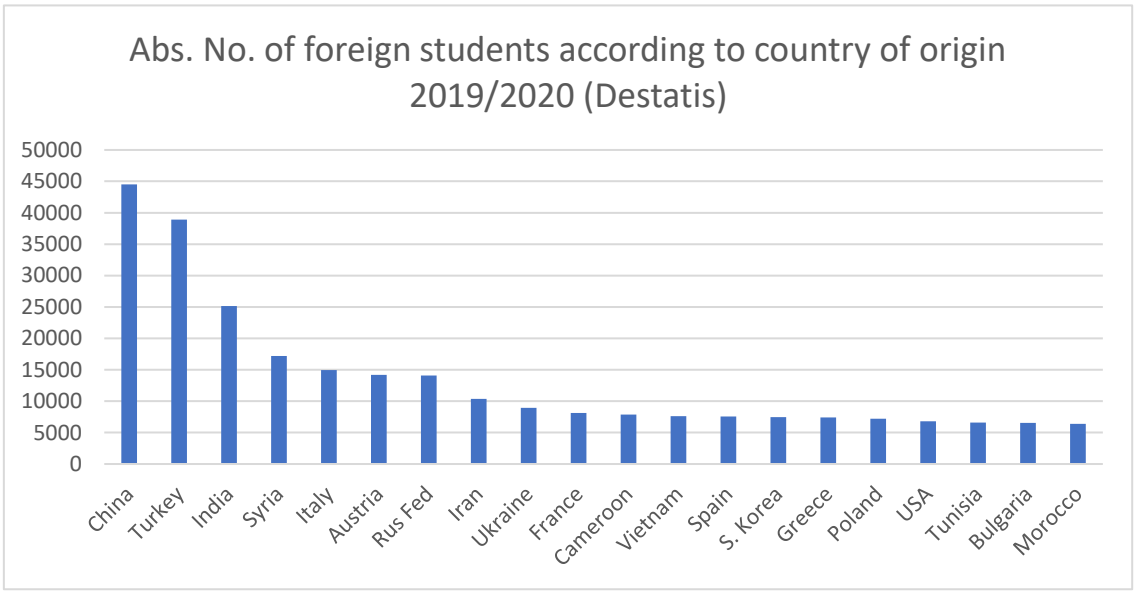
3.2.1.5 *International students in Germany according to country-of-origin 2019/20*



Source: (Statista) Destatis

[62] The Eurostat data are somewhat different from the German official data.
[63] This number is slightly more than Destatis have (see 2.7) both record education level 5-8. (Eurostat 2020).

Graph 3.2.1.5 shows that Germany acts as host to China and Turkey[64], with China topping Turkey by roughly 5000 students, and the majority of the countries are non-EU countries. The general aim to increase the diversity and number of qualified students on a global level is intended to help solve the problem of inequality, raise living standards, and provide for an all-round improvement for both those who have attained the further qualifications and their environment alike (Bok 2017, OECD 2019).

Internationalisation, as a concept that includes the international student, varies from country to country. Certain countries "export" more students due to lack of infrastructure, or because they are geographically located and linguistically equipped to avail of neighbouring educational systems and certain EU international students, serve as feeder countries, in particular countries such as Luxemburg[65] where the country may be small and not have a variety of courses to offer its students. This is not an uncommon factor for attracting students.

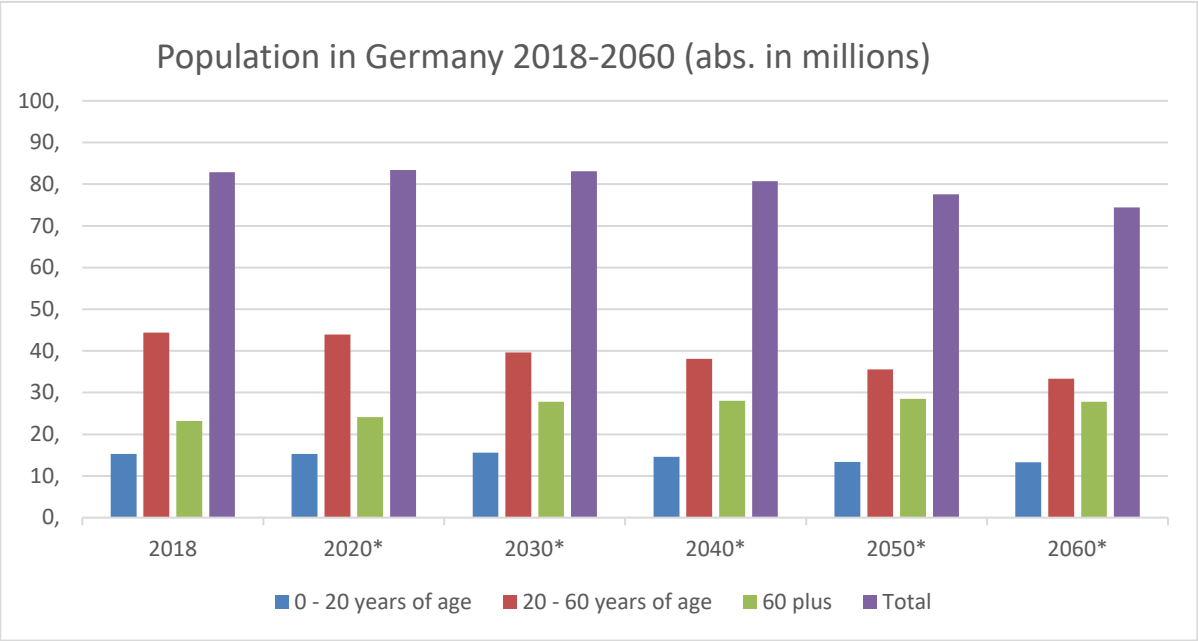
Conceptually differentiating between internationalisation and Europeanisation is necessary, for there are different stakeholders, and these impact on the conceptualisation, and on the academic culture, and the available sources of funds. Many of the ideals and aims are more of a challenge for internationalisation with non-EU regions than with the EU-regions. Although the EU offers support to the non-EU Bologna-based countries also through border operatives, there is an onus by the EU to support the education of EU citizens to facilitate and develop the EU market position and their knowledge economy.

3.3 Germany's demography

Before looking at the German student body, the next few lines describe the general demographical situation in Germany, reviewing the demographics, also within the context of the development of higher education in Germany. A Destatis report (2019) estimated a continued decline in the population of Germany. Graph (3.3.1.1) shows the expected decline from 2025 to 2060 from 83,7 to 74,4 million[66], and according to the age groups.

[64] The UNESCO data did not include Turkey as one of the top emigrant countries, differing from the Eurostat data due to the definition and sourcing of their data.
[65] In Luxemburg those wishing to study mechanical engineering have the geographical proximity, and linguistical opportunities, and networking structures rendering Germany as a complementary facet. As is the case for France.
[66] Destatis presented different prognosis about the potential demographics based on different models.

3.3.1.1 *Population in Germany from 2018 – 2060*

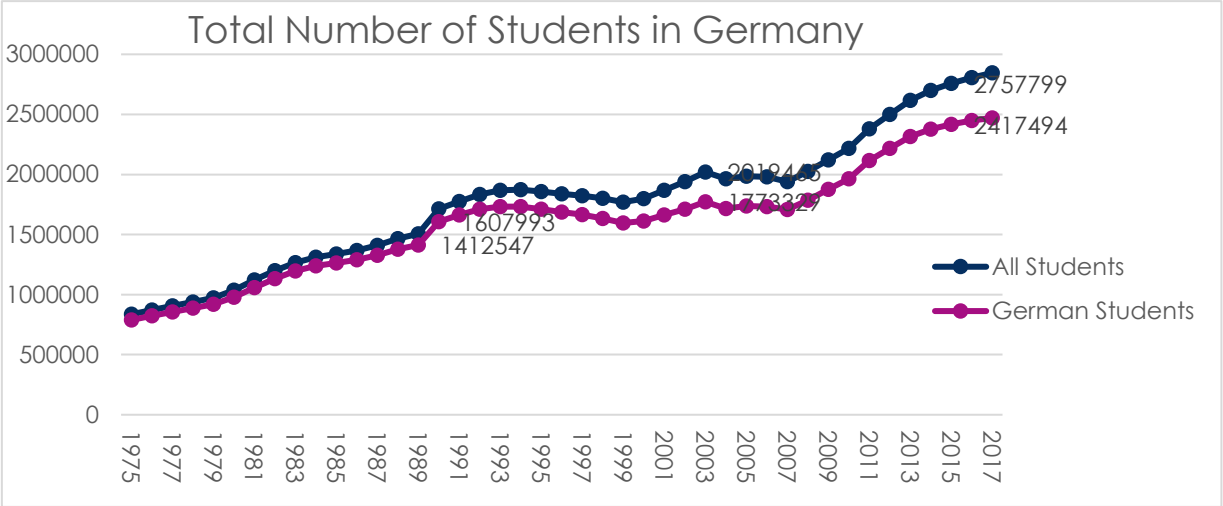


Source: Destatis (2019)

From graph (3.3.1.1) we can see a decrease in the 0-20 year olds, a decrease in the 20-60 year olds, an increase in the 60 plus group. This ageing of the population transforms to a dearth of potential younger students and a dearth of potential labour. With an estimated 1,6 births per woman (Destatis 2019) and a continued ageing population, immigration has somewhat compensated for the population deficits in the native population. To set that within the context of Germany and Germany's student body, roughly 23.6% (BpB 2019) [67] of the population have a migratory background, of those people, 12% are classified as German and 11,5% are classified as immigrants. Many are first, second, or third-generation immigrants. This is where the international students play a potentially crucial role in Germany.

[67] BpB (September 2019) provide data also on the demographic and political situation in Germany.

3.3.1.2 *Total Students and foreigners in Germany 1975-2017*



Source: Destatis (2019)

Hence, international students are not just a way to provide for continued internationalisation at home, and continued supply of the labour force, but an increase in internationals would help keep the HEIs busy. With a declining student body the future of HEIs as we know them will have to be readdressed. However, in order to identify if there are particular trends in the student body, we must also look at the development of HEIs over the last decades. The growth of all students in Germany and those defined as international by Destatis is depicted in graph 3.3.1.2. The first point in the graph shows that in 1975[68] there were 836.002 students by 2017 there were over two million more students with a total of 2.844.978 students registered in 2017.

The total actual numbers of students have more than tripled since 1975. Between 1975 and the present the political situation in Germany developed also through the reunification of the eastern states to form the sixteen states in the present Federal Republic of Germany. This growth in numbers is visible with the peak around 1991, which then evens off and peaks again around 2003, evens off again, and then steadily increases from 2007. The 2003 peak and the continued rise from 2007 coincide with the introduction of the bachelor and the phasing out of the diplom. According to the period of the graph the number of international students grew from 47.298 in 1975 and by 2017 there were 374.583 – that means the graph shows that the numbers

[68] In the late 1960s Germany established the Hochschule (now known as University of Applied Science) to accommodate the labour market needs for qualified engineering with more scientific and academic know-how, therefore the graph, beginning in 1975 encompasses this established phase of Germany's HEIs (Wienert 2014).

of international were just less than eight times the number of international students in 2017 from the starting point in the graph.

In terms of Germany's HEIs, according to the destatis data, the just under three million students were registered in 2017 in over 400 HEIs in Germany (DAAD 2018). The student population are catered for by a variety of types of institutions – universities, technical universities, universities of applied sciences, art universities, teacher trainer universities, music universities, medical universities, administrative universities - the list hosts a vast number of disciplines, in all 16 federal states.

Comparatively speaking, Germany's student population is below the aimed for average (OECD 2019). According to the data, in 2015 Germany had 3645 students per 100000 inhabitants in the tertiary sector. To set that within context a comparison with other countries includes the following from a variety of countries: Albania recorded 5102 students in the tertiary sector in 2015, Australia recorded 7925 students per 100000 inhabitants in 2016, within their expensive HEI system. The Australian government is eager to maintain and increase its international students, as they provide a source of income that reimburses the cost of education for the Australian citizen (DAAD). Bulgaria had 3742 students per 100000 in the tertiary sector in 2015, Ireland had 4598 students in 2016 per 100000 inhabitants. In the UK in 2015 there were 3578 students per 100000 inhabitants registered in third-level education. That means quite a small percentage of the population are in higher education. These students do not all equate to graduates.

Germany is nearing a three million student population body, to understand that in terms of graduates, Destatis presented figures that showed Germany in 2017 with a total of 501.734 graduations (Destatis 2018 p.11), in all the different examination qualifications and all fields.

However, it is not just the German student or German graduate population that is quite small. The percentage of the student population in Germany that is international is quite small. Yet this group have great potential, for if the international students qualify, they become an immigrant labour supply, bringing their culture into the labour market. These cultural differences add to the diverse cultural knowledge (Deardoff 2006). Those international students that stay on in higher education as employees add to the knowledge diversity of the programmes. This can have other positive spin-offs for the study programmes and the native students. Recent studies have shown that if the student experience is too similar to the school experience, detachment can ensue, therefore a motivation to remain in tertiary education is the diversity of the student life and education process (Pape et al, forthcoming).

International students add to the diversity of the HEI, therefore making students' experience for German and international alike more diverse. Also, if they remain in the HEI and work in higher education they expand on the cultural knowledge in the HEI. Therefore, increasing the social and cultural capital of the programme of which they are a part, and also increasing the cultural diversity and knowledge of that programme. This is important for the HEI, the programme, and *all* of the students. Furthermore, the more diverse population will also have different needs and many of which are met by varying types of services, primary and secondary.

The "secondary services" (Cubillo et al 2006 p 103) include characteristics of the HEI and the host country that are available to the international student, such as a pleasant and appealing campus, etc. International students when choosing their country to study in, consider aspects of reputation (Bourke 2000, Mazzarol et al 2002). The attraction for the international students, and the comparable attraction of the diplom to the present bachelor's degrees present different opportunities, as do the different types of institutions. In particular, "*78% of international students opt for universities, 22% for universities of applied sciences. German students decide more often for studying at a university of applied sciences. (29,5%)*." (DSW 2019)[69]. If a greater percentage of international students choose to study at a university as opposed to a university of applied science over the proportion of German students that choose to study in a university, what does this tell us about the type of students that international students are?

The UNESCO (2020) institute of statistics also looks at the flows of students in certain fields and also the demography of the students. Yet again, by using such data it allows us to see structural changes and this should reflect on changes in society[70]. In addition, awareness of educational opportunities facilitates those wishing to migrate for the sake of education. Webpages such as study-in-germany.org (2018) provide information not only on the number of non-nationals studying different courses in Germany, but also information on the types of courses and preparatory courses available before moving to Germany.

The international students that choose their Germany as a location have many different reasons for doing so. The prospect of future employment may be one. However, here, Germany has its own challenges in trying to appease the labour market deficits. Appeasing future labour market deficits, through lack of students also means looking at the gendered structures in our

[69] The DSW is the Deutsche StudentenWerk and operate to support the students, in the provision of information about their programmes etc.
[70] For example, according to their webpage 28 % of researchers in Germany are women.

education (McGrory forthcoming). If we address policies that are aimed to increase the proportion of females who choose more male-dominated subjects and analyse whether or not they are also working[71], it can provide insight into whether policies are taking a step in the right direction of removing structural discriminatory boundaries. Data show that there are still not enough females in the respective courses. In 2015 42% of the total students in UAS were females and in 2017 it had increased to 44%, however in the universities in 2017 51% of the students were female (Destatis 2019).

Of the over 400 HEIs that are available to the international students, just over 100 are universities/ technical universities in Germany, and they provide for a large percentage of the most populated degree courses and attract different types of students. Although the university of applied sciences are higher in number, providing applied science courses, they do not attract as many international students (McGrory 2020). Furthermore, the make-up of the student body changes, also according to the semester, with movement from universities to universities of applied science in more senior semesters (Grözinger and McGrory 2020).

3.4 Why compare international students and migrant German students?

This section analyses why the work also addresses the migrant German, and also why this work also includes German research and research in the USA on migrants with domestic qualifications for higher education. This is separated from chapter two because this group are relevant to the work but independent from the international students. They are relevant because the migrant German are contextually different, also diverse and face different challenges to the international students. Their cultural background, like that of the international students should also add to the cultural capital of the university. They often bring linguistical capital with them that the native student does not have or embrace.

The Destatis reports include calculations that are based on the category of students being either German or a foreigner. In this annual report the foreigners include international and migrant Germans[72] – those with the German qualification certificate for higher education

[71] Programmes such as MINT 4.0 that are aimed at Universities of Applied Sciences (Brötzmann Pöllmann-Heller, 2020). And mentoring to increase the gender balance and programmes such as MINT@Work at the TUM to identify and imbalances are aimed at removing structural discrimination (Welpe, 2021).

[72] The Destatis Fachserie 11 4.1 includes an annual report of the number of students, and breaks them down according to Deutsch Studierenden/Ausländer*in (German/Foreign).
Furthermore they define the situation which includes the change of law and
"[w]ith the fundamentally revised Nationality Act, which came into force on 01.01.2000, there have been considerable changes in German nationality law. In addition to the previously exclusively applicable principle of

(Destatis 2019). This is another reason to include the migrant Germans in this work. In the previous section, the population of German and migrants in Germany were presented. From this, the role of the migrant German/ Bildungsinländer must be considered within the context of higher education, also whether or not the percentage of the migrant German appeases the need for qualified students, and students in general.

In the German state of North-Rhein-Westphalia, Aver's (2017) produced a report that sought to identify factors that would increase the higher education success rates and/or identify factors that could reduce the dropout rate in higher education specifically focussing on students with a migratory background. Focusing on students with Turkish, Italian, and Russian backgrounds in five of North-Rhine-Westphalia's HEIs, the analysis aimed at identifying the factors that could reduce dropout or increase HEIs potential to facilitate that HEIs can provide for all. Therefore, the HEIs would be an institute that provides equality of opportunities for all and not just acting as a medium for education for persons that are not disadvantaged – financially, socially, or racially. According to his analysis, Avers was able to identify that those persons with a migrant-background are "underrepresented" (Avers 2017 p.27 o.t.) in higher education. Furthermore, the study included that the migrant students had, comparatively speaking, higher aspirations to achieve higher education than their German colleagues.

Aver's identified that part of the problem was as a result of the lack of contact between the family members and the schools (in leading up to entering HEIs) but also the focus of HEIs on "middle class" (p.27) meaning that the HEIs are neglecting the groups that they should be addressing. Through his approach, Avers was able to specifically analyse the problems facing this particular segment of society, and how their migratory backgrounds differentiate amongst the groups, concluding that there are inequalities based on migratory background.

The relevance of this is pivotal to the development of our society. HEIs produce our leaders, managers, CEOs, school directors, policy makers etc, and if they only ever come from the ever-narrowing middle-, and upper-class backgrounds, then we are recreating, reinforcing, and deepening inequality. And if we cannot encourage and facilitate a diverse student body, we will not have the insight to address pressing issues such as climate change because our "in" sight will exclude the majority of society (Armstrong and Hamilton 2015).

In the USA, Massey et al (2003) analysed the social background of minority students. Assessing the situation also according to the semester of the student, they could identify about

descent (ius sanguinis), the principle of place of birth (ius soli) was introduced, according to which children born in Germany to foreign parents can also acquire German citizenship under certain conditions. At the same time, the so-called generation cut was introduced. According to this, children born abroad to German parents no longer automatically acquire German citizenship under certain conditions." (Destatis, 2021).

the first semester students, that "*students who hold themselves in higher regard and who express greater confidence in completing academic goals do indeed go on to earn higher grades, drop fewer classes, and fail courses less frequently*." (Massey et al 2003 p.194). This corresponds to the work of Kokentar (1978). The authors continued that the higher levels of self-confidence differed according to the migrant group – similar to the results of Aver's work.

Massey et al (2003) also included that it is the various "form[s] of capital – human, social, cultural, psychic, or financial – that [are] important in producing success in higher education" (Massey et al 2004 p.206), furthermore, they deduced if human and financial capital were missing success was lacking. From this, it can be discussed that the students' success is related to the types of capital that they have. Hence, a lack of the various types of capital is connected to lack of success. This could help explain what issues exist in the differentiated student success rates.

If so then, by exploring the types of capital, it could be argued that "[w]hereas economic capital is in peoples bank accounts and human capital is inside their heads, social capital inheres in the structure of their relationships. To possess social capital, a person must be related to others, and it is those others, not himself, who are the actual source of his or her advantage. "(Portes p.2001). If the analysis reverts to the work of Aver (2017) the success rates or rather lack thereof of the migrant students, then the lack of interaction between different groups would explain the lack of social capital.

Whilst in Massey's work self-confidence was shown to promote ability, these results of self-confidence differ somewhat from both the context of Aver (2017) and the Mercator Stiftung's report (2018), whereby too much confidence was considered to be related to lack of success in HEIs. In the latter two reports, self-confidence amongst the Turkish migrant did not mean greater capabilities enabled achievement. Whilst Massey's work is important because it highlighted the importance of comparing the different ethnic groups to the, in that case, white Americans. Hereby the author was able to distinguish that Black Americans saw themselves as less of a part of the group than Asians. It could be argued, that where a student maintains a sense of not belonging, this counters the ability to engage, reduced engagement and reduced integration reduce the likelihood of success (Tinto 2012).

A 2011 report on living and working and poverty in Germany reported that (Pollack et al 2011) being a first-generation migrant increased the risk of being in a "lower" socio-economic background[73]. Being in a lower socio-economic background implies that in the event

[73] The paper identified risk factors which included having three children, single parenting, migrant, unemployed, and being a child. (p.22).

of choosing to study the student will need funding from other sources, and as the majority of funding is private and not via the state granting loans system this would imply that employment is the means to support the student through their higher education. This can imply that first-generation migrants have a higher number of employment hours during the course of the study. Studies have proven, that if employment hours exceed 25 hours per week, this can have a negative impact on the likelihood to complete your tertiary education (Hovdhaugen 2015).

Studies have also identified the negative impact that being a migrant can have on early education (Debuschewitz and Bujard 2014), and in the 2019 OECD report[74] the disadvantages that students with migratory background have, and that this was shown to be a hurdle for their education.

In summary, the importance of comparing the success rates of the international students with the foreign German students can lead to a better understanding of the different success rates, if there are differences and what might cause these differences. By including the work on the cultural capital (Deardoff 2006), and Killick's (2012) global student, and placing this within the context of diversity of cultures, again this may contribute to understanding differences in success rates between or amongst the international student and the migrant student.

3.5 Theoretical framework

> "*Overreliance on a particular theory or framework has the potential to perhaps reproduce hegemonic norms and thwart innovation, indeed sacrificing good theory for the sake of conceptual and measurement efficiencies may limit our understanding of college and its effects on students.*" (Mayhew et al. 2016 p.585)

The following pages deal with theories in the literature review that contribute to understanding and explaining international student success in Germany's HEIs. They boil down to two different themes – students' integration and student migration.

3.5.1 Interaction/Integration

Regarding higher education institutional research: There are three particular authors that have remained in the spotlight concerning student dropout and persistence: Astin (1984, 1999), Kuh (Kuh et al 2005) and Tinto (1973, 2012, 2017). Astin's focus was to create a theory about

[74] Education at Glance is the annual report comparing, amongst other things, education in different countries.

behaviour, and that could be applicable without having to draw boxes with arrows (Astin 1999). His theory of "[*i]nvolvement refers to the investment of physical and psychological energy in various objects.*" (Astin 1999 p.519). The second person, George Kuh (Kuh et al 2005), has been the force behind the concept of engagement in higher education. This idea includes the engagement studies, again the concept here is identifying that if a student is engaged (in varying ways) they are more likely to succeed (Kuh et al 2005), and this idea allows for variability in what influences engagement. The third theory is Vincent Tinto's integration (2012). Tinto does use various boxes with arrows to explain dropout, and Tinto has arguably held the centre stage when it comes to theories to explain student departure and in trying to facilitate understanding student success (Mayhew et al 2016). The next paragraphs will focus on Tinto.

Tinto's model of integration stems from Durkheim's theory of suicide. As the founder of the Sociology of Education, Durkheim theorised about the development of education and the individual within society, and his sociological explanations about education development within society (Durkheim 2012). Durkheim's provided sociological theories about the types of suicide in the form of departure. Tinto's theory of integration (1987) has a stronghold in HEI research, which was based on departure. The theory is that integration is focal to student success in higher education – because integration is considered to be quintessential for success (Tinto 2012). Integration being where the student is part of his/her environment, to the extent that not being a part of the environment would *contribute* to not succeeding. The environment has different systems, academic and social, in either case integration into one does not demand or dictate that there is integration into the other, nor does it presuppose a definite route for success (Tinto 2012 p.100-109). For Tinto departure from higher education was not being integrated which was based on Durkheim's theory of the types of suicide. The theory of suicide is about identifying how or what social facts cause suicide (Ritzer 1992). Therefore, the social order in (the students') society should facilitate integration and this integration leads to students succeeding. A disorder of social facts, or social structures (Ritzer 1992), could explain departure and dropout rates of students. This also means that the student theoretically conforms to the norms, and non-conformity could lead to departure.

One area where Durkheim and Tinto differ in the application of the theory is that Durkheim's work was focused on understanding how social facts could sociologically explain suicide amongst groups (Durkheim 2012, Ritzer 1992). Tinto differentiates his theory from that of Durkheim because of the group setting. Tinto's setting is in a society where the students were part of a social systems and structure that was relatively stable, in that they were resident on campus – and thus his approach has an individual factor in this analysis. It could be argued

that this individual component in Tinto's work over that of the group component in Durkheim's analysis of suicide types is the difference that allows for the usage of Durkheim's theory because it is based on groups. Here, the international students are a group that differ from the German students because of their movement across borders. This movement means separation and decoupling from previously practiced academic and cultural norms. Furthermore, Tinto (Tinto and Cullen 1973, Tinto 1988, Tinto 2012, Tinto 2017) takes the student as the epicentre of the explanation. Durkheim's seeks to see groups as a part of the social fact. Tinto (2012) identifies that Durkheim's work focused on groups, and it is exactly because of this part of Durkheim's theory which is useful in presenting different rates between the different groups within a group of institutions (p.100-105).

Rather than prove integration, researching international students' success rates in this work will take integration as a given, that where there is success, there is a successful integration process. However, poor success rates between groups will be the product of a break in the *integration process, or social disorder or a dysfunctional group*. That comparatively low international student success rates imply the process as being ineffective – thereby allowing the theory to observe the group and/ or the setting within which the group should function. Therefore, integration as a theory can be used in this work, because integration does not presuppose the assessment of the individual, but indeed allows for an understanding that the integration process manifests itself in the form of a group with success being the product of successful integration.

Tinto's based his theory upon Durkheim's egoistic suicide; however, this work pertains that not only egoistic form, and does not exclude the adaptation of anomic and altruistic forms of suicide (Durkheim 2012) in the adaptation in order to understand student success. In the literature review loneliness was presented as a factor that was addressed in HEIs in order to ensure integration was not being inhibited (Araujo 2011, Constantine et al 2005). Loneliness may also be understood as subjective sense that is not the opposite of integration but a state of being that impedes a sense of belonging. This is a disconnection from the students' environment and where a sense of belonging implies that the student, at some level has a subjective sense of integration, the loneliness implies isolation at some level, and this sense of isolation can be understood as distance and here too, in our contemporary societies anomic suicide could be used to understand departure. Early departure of the student from the university or HEI may manifest itself when the process of moving to a new location to study is stunted through the existing bonds with the place of origin. That is not to say that moving necessitates a complete break of ties but, in understanding the expansiveness of integration we need to bear in mind that

"[*the] lack of integration which has been posited elsewhere as a primary cause of student departure is not necessarily a reflection of an absence of incorporation alone. It may also result from the inability of students to separate themselves from past associations and/or to make the transition to new ones.*" (Tinto 1988 p.449).

This idea that the student cannot distance themselves from past structures leads to the second theoretical approach - migration.

3.5.2 Migration theories: migration systems theory and labour migration theories

> "*Apart from this spatial (or horizontal) dimension of the movement, there is also a socioeconomic (or vertical) dimension involving a permanent transformation of skills, attitudes, motivations, and behavioral patterns such that a migrant is enabled to break completely with his rural background and become entirely committed to urban existence." (Mabogunje 1970 p.2)*

The second theoretical approach that this work uses is from the field of migration theory. In general, migration theories can help explain the student success rates because this work compares a group that are (im)migrants and migration theories also include push-pull explanations. The demographical migration theories allow for predictive modelling and the sociological perspectives allow for the explanatory approach (Brettell and Hollifield 2014). Furthermore, migration theories accommodate the usage of comparative analysis, therefore the applicability of migration is suitable due to the dimensions and disciplinary applicability and the data and methods that this work uses.

According to King (2012) the breakdown of migration theory, because of the different disciplinary interests, has limited depth and a need for further theoretical development. The theories include "Neoclassical economics and push-pull theory" (King 2012 p.12); and other developmental theories including that by Zelinsky (King 2012) who took a broader perspective and included the historical industrial developmental stage in the process of mobilisation. King's work reiterates the importance of networks theory for migration (p.22), which includes aspects of social embeddedness from Granovetter. One other theory that is suggested is that of "New Economics of Labour Migration" (p.22) as this, in comparison to the neo-classical approach, does not exclude repatriation from the form of "success" (p.23). Thus, Kings' literature touches on the varieties of migration theories that are relevant to different aspects of migration today. Ultimately, King's contribution is not just restating the need for interdisciplinarian approaches (Castles et al 2014, Hollifield 2012, King 2012), but also for allowing the study of migration to

explore the "experiences" (p.25) of the migrants. Incidentally, it is this, incorporation of the experience that was also the basis for Tinto's (2017) more recent work on understanding the student. King identifies the need to understand student migration because of their contribution to the labour market and that by understanding the movement of students, this can help identify future labour migration (King and Raghuram 2013).

King aptly points out that in an endeavour to explain the migratory status, the question remains as to why there is not more migration (p.26). This is also to be reflected upon considering the free – of charge tertiary education, why there are not more home-based persons in Germany's higher educational institutions? King also highlights how imperative it is to integrate the gender variable in order to understand migration, for excluding can only lead to a biased answer in understanding the migration process, however, exactly because certain fields of study are gender dominated, it can hinder the release of data, because the numbers may be too small.

The push-pull migration theories can contribute to explaining the international student's success rates in Germany. The following conditions are considered:

a) the students matriculate - this could be push or pull.

b) they are attracted / pulled to Germany.

c) previously, they qualified in a diplom degree course – this is most likely a pull factor because the five-year German diplom from the university or technical university; and the four-year diplom from the university of applied science are, from an international perspective, quite unique.

d) the provision of free-of-charge higher education is probably both a push and a pull factor as students may choose to study in Germany because of the lower costs. They may also be pushed to doing this because it is the only real option in attaining a (n international) higher education qualification.

Castles et al (2014) highlight that in migration, those who do choose to migrate, - and such is the case for students in higher education, it is a choice – they are usually those who can afford to make such a choice (p.47).

In order to understand international students' success rates, by using a theoretical framework, an option is migration systems theory (Mabogunje, 1970) which explains that those who do (em)migrate go through the process of decoupling and coupling. Migration systems theory in essence involves decoupling – from previous habits and behaviours. This decoupling process, it could be argued, frees the students, and allows them to realign themselves with the new systems and processes. Arguably, students that are familiar with the structures and cultures

have less conflictual issues, therefore, theoretically, students that have migrated within Germany should have the best success rates. Mayhew et al (2016), in their review of How College Affects Students included the work of and on Tinto, one of the criticisms about Tinto's work on students' ability to succeed in college was that initially he argued the importance of decoupling and later retracted on this as being relevant for the students' ability to succeed. Therefore, the overlap between the process of decoupling emerges in both theoretical approaches taken in this work: in integration theory and migration systems theory.

However, the data is limited in its applicability to migration systems theory which looks at the movement and the impacts, positive and negative on both sending and receiving locations. A functional migration process should contribute to students' succeeding, as opposed to a dysfunctional migration process which would make it comparatively more difficult for the international students to succeed. Massey et al (2009) aptly describe the development of migration and the social structures that may be modelled to describe and understand international migration.

Furthermore, to tie up the idea of migration theory and that of integration we can apply social systems according to Parsons and Smelser that identify the role, in this work's case, the role of the international student as a part of

> *"[a] social system [which] is the system generated by any process of interaction, on the socio-cultural level, between two or more "actors." The actor is either a concrete human individual (a person) or a collectivity of which a plurality of persons are members. A person or a collectivity participates in a given system of interaction not usually with its whole individual or collective "nature" or set of motives or interests, but only with that sector relevant to this specific interaction system. Sociologically we call such a sector a role*." (Parsons Smelser 2010 p.10).

Although Parsons and Smelser's work was based on the analysis of the *economy and society* and the system and sub-systems within society, their analysis of the system and the interaction and how this interaction impacts on systems is mirrored in HEIs. This interaction, when it is positive, encourages more interaction between more individuals and has a positive impact on the entity. The international students are actors within the social system, and the HEI is a part of this system, the motives, or interests of the HEI are conform to those of the international students and national students alike – in such a case the rates of the group of international student and national students should not differ. Where a difference exists in these groups' success rates then the system, on whole, does not accommodate for the plurality. Hence,

the international students have established themselves, and successfully migrated and integrated, and have a role in their new social system. That international students' success rates establish a social system where each part of the system has a role, and where the roles integrate, then integrationalism paves the way for better success rates.

3.5.3 Summary of context and theoretical setting

The relevance of researching the transition in Germany from the diplom to the bachelor (Hackl 2001) analysed the developments during this process. The process lay at the heart of the Sorbonne Agreement and the Bologna Process (EHEA 2020, HRK 2020), in establishing "mutual recognition" of higher education through creating qualifications that were mobile (Hackl 2001) and facilitating labour mobility, which in turn could feed into a needy labour market (McGrory 2020, McGrory forthcoming).

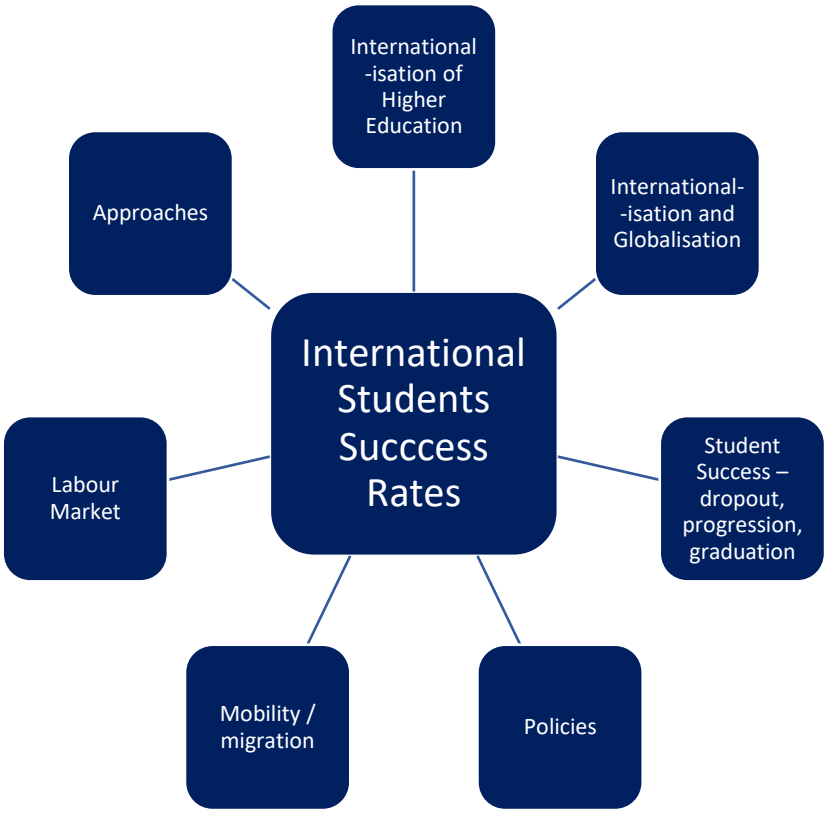
Previous research presented student dropout, cost of higher education, types and duration of study programmes, the different international destinations and sending countries and the growing competition of attracting international students (Glockner 2009, Grözinger 2009, Hackl 2001, Heublein 2014, Isserstedts and Schnitzer's 2002, Klöpping et al 2017, Kokentar 1978, Tinto 1973, Tinto 2012, Tinto 2017, Thi 2008)). Research covering labour market and social and/civic engagement, involvement per se, and engagement in the class, were also dealt with (Kuh et al 2005, Watson et al 2011). Migration, migratory policies, and the relevance of such to the labour market play a role in the diversity of international student (Castles et al 2014, Florida 2012, Goldin & Katz 2009, King 2011) Mabogunje, 1970, Massey et al 2005,) and how the ability to qualify an international student has growing relevance for the reputation of the host country (Mazzarol Soutor 2002). One pillar of researching international students dealt with the well-being and loneliness of this particular group (Araujo 2011, Ardrade 2006, Boyer and Sedlacek 1987, Wright and Schartner 2013). The different sending regions preferences for university programmes rather than the university of applied sciences were presented in the literature review. This work did not decouple international students from migratory factors but included migration as quintessential to understanding the international students' success rates, because why people move and from where they move can later explain the varied success rates of the international student.

The work included the role of stakeholders, whereby a stakeholder is any of those bodies that have a vested interest in an international student, and theoretically a vested interest in their success. Such stakeholders include the students, the DAAD and other groups in society. Some of these groups are aghast at the lack of qualified labour or the high number of those who discontinue their study programmes (Heublein 2014). Thus, this chapter also used theories to understand success in higher education: a) the role of integration in relation to students' retention (Tinto 2012, Tinto 2017); b) and migration theories (Gëdeshi King 2020, King 2011, King 2012, Massey et al 2003, Massey et al 2005).

Therefore, research indicated that the international students are motivated, yet interaction with the natives is a recurrent problem. However, international students integrate with other international students. This can slow down their linguistical developments, prolonging the time needed. The duration needed for the bachelor should meet the labour market demands, and being more comparable with other countries, then also be more competitive.

The graph (3.5.3.1) depicts the facets of the literature review which were relevant in order to research international students' success rates in Germanys HEIs.

3.5.3.1 *Themes related to international students' success rates*



There is a growing body of literature in Germany regarding infrastructural support (Kercher 2018, Rech 2012), but often through projects that focus on the quality and teaching in Germany[75]. There is an ongoing need to analyse the higher education institutions and fields of study per se concerning intrinsic internationalisation in the form of international students' success rates. By assessing the rates, we can assess the success of change and developments within the HEIs.

3.6 Research question

The main question this work seeks to answer is:

- What are the success rates of international students in Germany's HEIs?

However, a number of questions also need addressing, such as:

- How do the success rates of the international students compare to the German students specifically in the following fields of study: mechanical engineering, electrical engineering, and economics?
- Do the international students need longer than the German students to complete their degrees?
- Does the bachelor facilitate better success rates than the diplom in a particular field of study?
- Do the international students' regions of origin present different success rates?
- Is there an identifiable trend in the international students' success rates?

3.7 Hypothesis

The working hypothesis is that the success rates of the group of international students are less than the success rates of the German students.

The second hypothesis is that the success rates improved with time.

The third hypothesis is that the success rates are better in the bachelor than in the diplom programmes.

[75] The ministry for education saw the need to invest in understanding and supporting teaching mechanisms in HEIs through a line of funding that focused on this area. Considering that international students as such, are a relatively small percentage of the corpus of students, they are not the focus of major research questions.

3.8 Interim summary

This section discussed the importance of international students' success, rates and proposes using these rates to address the position of the international student in Germany. It addressed the concept of internationalisation of higher education and why strategies to support this structural change are important in higher education. Higher education was the medium by which inequality in the past has been reduced (increasing numbers of graduates, with an increased income, amongst different communities, opens opportunities to different types of employment and removes visa restrictions as the qualified student can apply for labour), and this reduction of inequality has slowed down. The chapter presented the demographics of Germany and the role of the international student also from a demographical position. The student population are present in the form of the administrative data, this means measuring international students' success is possible with the administrative data. To help understand the process, the theoretical framework borrowed from two theoretical concepts, both theories included the concept of decoupling (Tinto 2012), and when these theories are applied to the international student, the role of integration and with whom the international student integrates reinforces the need to address international students' ability to integrate into the new system. The motivation to be a successful international student was also presented also because being successful removes restrictions and makes the labour market for immigrants accessible.

How the administrative data can be used to measure international students' success rates will be explained in the next chapter. The chapter will also present the ability to measure the different regions from which the international students come. This will help to realise the ability of the international students to succeed and how long they need to complete their programmes in comparison to their German counterparts. The ability to compare the groups, their presence, and success rates will be explained, as will the creation of the cohorts which are based on the point in time at which the student registers, and how this can be applied to understand whether there is a trend over the period of time incorporated into the analysis. These factors and others such as region of origin and type of graduate qualification, can be evaluated with the administrative data, which records each student's registration and examination in Germany's HEIs.

4 The administrative data: how the variables make a cross-cohort model

4.1 Overview

Germany is a federal republic and each of its 16 states have their own ministry for education. The HEIs in each of the states have autonomy (HRK 2020). When a student registers in one of the HEIs, or if they sit a final exam, the HEI records this in their data, and the HEI continually records this information – of students and examinations. The data are recorded according to a master questionnaire and codebook, with all pre-defined definitions and in accordance with the Federal Statistics Office. Each HEI then forwards their data to the ministry. The Federal Statistical Office works with the Federal Data Research Centre, which have been working with this format since the recordings began in 1995 and are ongoing. Hence, this digital format of recorded data is spanning over two decades. This also means that the official statistics provide an abundant source of information in the form of secondary data. This data can be used to identify structural changes in Germany's HEI landscape (Teichler 2007 p.237).

There are a few Federal Data Research Centres in Germany. Each centre has a specific stronghold. The German Data Research Centre responsible for data about higher education is in Munich, where the data is stored. The research centres cooperate so that the working stations can be used in a location other than the centre responsible for that particular disciplinary field. The nearest centre to Flensburg (where this work was based) was in Kiel, in the state of Schleswig-Holstein.

The project out of which this work was borne applied to the Research Data Centre in Kiel with a research question and request for usage of the data. This was part of the *Hochschulstatistik Nutzen!* Project which was funded by the BMBF from January 2017 up to September 2020[76]. Our application for usage of the administrative data also included that we sign an affidavit and submit passport details before being granted access to the data and these workstations[77].

[76] At the time of writing the project was granted a few extensions for reasons varying from data protection restrictions, change in the numbers of employees and the knock-on effect of the SARS-CoV-2 crisis.

[77] Generally, access to the data (in Kiel), is gained upon completion of a written proposal. The datasets are leased, meaning that a sum of money is paid per dataset. Then those people who wish to work the datasets apply for access, are then vetted, and checked to see if there is a danger of transgressing data protection laws. Thereafter, the researchers sign a document declaring that their intentions are honorable, and that such issues as "nosey parkering" are not permitted or tolerated. In addition, every access to the workstations is done by requesting permission to use one of the two workstations. However, with SARS-CoV-2 only one person may access the workroom per day. The workstations are docked, and access is not permitted with equipment, meaning that no technical equipment, pens, computer pens, or paper are allowed at the workstation. When the researcher starts working at the workstation, a log records all activities that the researcher has carried out with their data.

4.2 The data – permission, institutional procedures, and peculiarities

We were granted access to the data in April 2017. The data that we applied for included all student data from 1995 through to 2015 (at the time of writing), and all examination data from 1996 to 2015. The personnel data included all files from 1998 through to 2014. In general, the Research Centre (hereafter FDZ) needs two years after having received the data from the HEIs before it can be released for research by external bodies, so we had the most recent data that were accessible for external research.

Roughly 40 datasets[78] were provided. Each dataset is either for winter or summer semester, student, or exam data. Initially, we combined the student datasets into one large dataset, and one large examination dataset. In the student data, each of the student winter semester files has roughly between 1,6 million and 2,9 million cases. We created and merged a third dataset that annually records all of the HEIs' employees.

We modified the datasets, which is described below, creating a modified data file. This ensures the maintenance of the raw data and creates new variables based on the information of the original data. From both a temporal perspective and based on their content, the federal data in Kiel presents huge opportunities in analysing different facets of students' situations.

Because the workstations are limited and the time with the data was restricted, merging the large datasets into an even larger dataset consumed too much time as a process. Therefore, a lot of the procedures were run with the selected datasets for the selected cohorts. Once data was analysed and put into an "outbox" this is controlled by two of the colleagues in the research centre before being released. Waiting on the release of the data depends also upon the workload of those in the research centre. The appendix shows the list of the raw files that we used.

4.3 The files and their challenges

The merged student dataset contained over 66 million cases, which is all students that were matriculated at any point in time in a higher educational institution in each of the semesters in Germany from 1995-2015. From those cases, roughly 59 million have subjects listed. That means there is a large section of the data that is incomplete[79]. These missing cases are not in any one particular year, or in any one particular HEI.

[78] 20 years, with a complete year being summer and winter; and separate data files for student and exams (List of files).
[79] There are multiple possible explanations including that of the students' status etc.

Each student and exam data file is per semester. However, the files were not always in the same format, meaning the data structure was not always chronological. This meant that programming[80] needed to read in the original file, and creating new files based on one particular template. The differentiation of formatting was extreme in the personnel data files, from year-to-year variables were sometimes present or sometimes not present or in a particular format, or in one format one year, changing the next year and back to the original format the year after. As with any work, it takes time to develop a system or process. The data reflects the intention of the HEIs with their restricted resources – in general the data is in good order, however, there are exceptions.

4.4 The variables and their challenges

Before addressing the potential pitfalls within the datasets, the following presents some of the variables that were the reason for choosing this data and for using a cross-cohort analysis of success rates. A cohort has some commonality. By creating a cross-cohort analysis, it maximises the use of the data (Bandorski et al 2019a). The variables included (with student dataset / exam dataset):

Ef1: Federal state (student and exam data)
Ef2: Semester (student and exam data)
Ef3: Year (student and exam data)
Ef4: HEI (student and exam data)
EF7: Gender (student and exam data)
Ef9: Country of origin (student and exam data)
EF12 : Student status (Permanent, etc)
EF16 First German HEI where student was registered (student and exam data)
Ef19: Numbers of semesters in German HEIs in total (student and exam data)
Ef26: Registered as: First registration/ exmatriculation/ etc
Ef28 Type of study: Presence etc
Ef29: Type of study: Full-time etc
Ef30: Numbers of semesters based on the course that you are now aiming at completing (student and exam data)
Ef31: Course\type for which the student is registered (student and exam data)
EF32: Subject (student and exam data)
Ef34: Second subject (student and exam data)
Ef36: Third subject (student and exam data)
Ef111: Place of receiving the right to matriculate (student and exam data)
Ef121: Numbers of semester based on this exam (exam data)
EF126: Course / Type of Exam (exam data)
EF127: Subject for which the student was examined (exam data)

[80] All programming was done through SPSS – both workstations in the FDZ centres have SPSS 21. At the time of writing the two FDZ workstations allow analyses with SPSS and then the controlled data is delivered in Microsoft excel format.

Ef132: Month of final exam (exam data)
Ef133: Year of final exam (exam data)
Ef135: Final Grade (exam data).

All variables were in numerical format. However, there was a change in Higher Education Statistics law, so with the 2017 data the majority of the variables changed in name and format[81].

4.5 **Variables about HEI**

The variable Ef4 records the institute of higher education. This variable is central to some of the challenges that we faced with the data. The problems with the EF4 variable are manifold. However, a temporal analysis allows for the identification of issues that are temporally based, but also include temporal developments such as those that the HEIs encounter[82]. The Research Centre records any changes that happen to HEIs, and these are included in their master questionnaire and codebook, so when HEIs merge it is included, when they close, it is included, when they change their names or functions that is included and recorded in the codebook.

All structural alterations must be included in the analysis, this means identifying cases, checking their regional relations, and recoding them into new variables. For example, in the region of Essen (NRW) the University Duisburg - Essen 0080 is the base for departments that were University Duisburg or University Essen or parts of either University in the other town. This means, that for example, the following list depicts that the code 80 is the code used, and in order to avoid any misdemeanours all of the following are recoded into the university Duisburg-Essen (Bandorski et al 2019a).

- (0070) (Duisburg, U-GH) now 0092 Dept. U Duisburg - Essen
- 0080 U Duisburg - Essen
- (0090) (Essen, U-GH) now 0091 Dept U Duisburg - Essen
- (0092) (U Duisburg - Essen in Duisburg) now 0080 U Duisburg - Essen
- (0091) (U Duisburg - Essen in Essen) now 0080 U Duisburg – Essen

[81] The analysis began with the pre-2017 data. With the 2017 dataset come a change in variable names and format. Changing the names of variables is one thing but changing the format also to string is nothing short of short-sightedness. Another act that is a waste of time.

[82] For example, in Lower Saxony there was a change in policies between 2006-2010 that merged the administration functions between the different HEIs. This meant that the responsibility was varied, and therefore open to variation as to what might happen with the data.

The university Essen-Duisburg is not alone in this, there are numerous HEIs that have contributed through their collaboration to a success rates of new partner HEIs, and this work has taken that into consideration to ensure that all notations according to the codebook are carried out, the recoding of the HEIs is in accordance with the codebook.

4.6 Subject, Field of Study and Subject Area

Each HEI offers different degree courses and different subjects, and although these conform to definitions set by administrative bodies, analysing according to subject is so microscopic, our research to date assessed that it would not suit the data available, and the method (Bandorski et al 2019a). Given the variations and similarities, the idea was to compare fields of study, beginning with those fields of study that are the most frequented and attract international students (see below). The fields of study as the comparatum are predefined and in accordance with the codebook set in the student statistics and examination statistics. The predefined codes mean that the qualification awarded, for example, was either a degree in mechanical engineering, electrical engineering, or economics. This allows for scope and movement between subjects. Overtime, some subjects develop into their own field of study, from a given time. Such is the case with data from 2016, concerning one of the mechanical engineering subjects[83] which will no longer belong to the mechanical engineering field but to another field. This is all manageable once it is known, problems however occur when something is not known, or not transparent, or a lag in time between this being noted on by those releasing the data and the actual recording of the data.

The student and examination datasets have similar structures, which facilitated this analysis. In the student data the variable ef32 was used to form the field of study, and in the examination data the variable ef127 was used for the formulation of the field of study. In the examination data, variable ef32 was not always conform with the contents of ef127, therefore the discrepancies supported the decision to use the variable where the recorded examination information was gathered.

The official codebook (at the time of writing) has the following different subject areas:

- Humanities
- Sports
- Law, economics, and social sciences

[83] In the official statistics the codebook for the winter semester 2015/16 realigned the subject code 177 into another field of study so up until that point that code was a subject in mechanical engineering, thereafter it was to be coded in a different field of study (Destatis).

- Mathematics, natural sciences
- Human medicine / health sciences
- Agricultural, forestry and food sciences, veterinary medicine
- Engineering sciences
- art, art studies
- Outside the study area structure[84].

These are the overarching titles, thereafter, come the fields of study, which are then subdivided into their subcategories – the subjects. We define the fields of study in accordance with the subjects that are in the official statistics codebook to create the variable FoS (Field of Study) based on ef32 in the student dataset and / or ef127 in the examination dataset. Therefore, the subjects listed by the official codebook facilitates consistency which enables a comparison.

In both the student data and examination datasets the variables ef32/ef127 record the subject which is a subcategory of the field of study. However, we decided to use the field of study instead of the subject because of the potential movement between subjects but within one field. For example, mechanical engineering is a popular qualification for international and national students alike. The field of study attracts a lot of students also from abroad (Destatis 2019). Mechanical Engineering as a field of study, at the time of writing, included the following subjects:

(141) Waste Management; (143) Ophthalmic Optics; (033) Chemical Engineering/Chemical Engineering; (231) Printing and Reproduction Technology; (211) Energy Technology (excl. Electrical Engineering); (212) Precision Engineering; (202) Manufacturing / Production Technology; (215) Health Technology; (216) Glass Technology / Ceramics; (082) Wood / Fibre Technology; (241) Nuclear Technology / Nuclear Process Engineering; (219) Plastics Technology; (104) Mechanical Engineering; (108) Metal Technology; (224) Physical Technology (144) Technical Cybernetics; (225) Textile and Clothing Technology / Industry; (074) Transportation / Conveying Technology; (457) Environmental Technology (incl. recycling); (226) Process Engineering; (213) Supply Engineering[85].

The second field of study that was analysed is Electrical Engineering and it has the following subjects:

(316) Electrical Power Engineering; (048) Electrical Engineering/Electronics; (157) Microelectronics; (286) Microsystems Technology; (222) Communication and Information Technology; (088) Optoelectronics.

The third and most populated field of study that we examine is Economics, as a field of study has the following subjects:

[84] Translated with Deepl (March 14).
[85] Translated with Deepl.

(011) Labour Studies/Economics; (021) Business Administration; (167) European Economy, (304) Media Studies/Media Management; (182) International Business Administration/Management; (166) Sports Management/Sports Economics; (274) Tourism; (210) Transport Economics; (175) Economics; (181) Business Education; (184) Economics.

Hence the one variable is used to define the subject, field of study and is also used to create the subject area.

4.7 Variables about (inter)nationality

In order to compare German and Non- German students in the administrative data this work uses the variable ef9. It records the students' nationality[86]. However, at the time of writing if the student has multiple nationalities, it only records one, and if one of these are German[87], then it only records the German nationality. Neutralisation[88] is something that can explain certain issues in the data.

If statistics base their analyses' only on nationality (ef9) it means the cases are categorised according to whether they have German citizenship[89] or are foreigners. In addition, there are also cases of statelessness, and there are missings in the data (see below).

Bildungsinländer (Kercher 2018) is the term used to describe students who do not have a German citizenship but possess a German university entrance certificate (Kercher 2018) as opposed to Bildungsausländer – those foreign students with the foreign university entrance certificate (Kercher 2018). By using EF9 (nationality alone) we would only by defining our cases based on the nationality of the students. Hence, we also use the variable about where the student was granted their university entrance certificate (McGrory 2020).

4.8 International Student and the University Entrance Qualification

Where the students attained their right to matriculate is available in the dataset and provides for a simple method of differentiating between groups. The university entrance certificate or right to matriculate has an abbreviation in German: this is HZB[90] . The variable

[86] Ef 9 in the student and examination codebook records the student's nationality.
[87] German law dictates that where there are multiple citizenships if one is German all others are of secondary nature.
[88] Where a person, under German law, becomes a citizen of Germany under the process of neutralisation, and adheres to German law in the first place.
[89] Citizenship being the right we *may* become at birth or later through an act because of an application of process, that grants us the respective entitlements of that nationality.
[90] Hochschulzugangsberectigung means the person is certified with a right to enter tertiary education, there are several ways of gaining this qualification. In Germany the entrance qualification certificate or matriculation varies,

for this is EF111 - and is in both the student data and in the examination dataset. Therefore, I developed the following matrix that incorporated the citizenships and where the students qualified to enter universities:

Ef9: Country of origin
EF111: Place of receiving right to matriculate

Both variables – ef9 and ef111 are used to create the following groups:

- 1. German Citizenship and German HZB (GG)
- 2. Foreign Citizenship and German HZB (FG)
- 3. German Citizenship and Foreign HZB (GF)
- 4. Foreign citizenship and foreign HZB (FF).

The matrix for these two variables forms the variable international_student with the four values as listed above. Missing cases, and statelessness in either of the two variables were excluded from the analysis. The normative understanding here is the value reported by the student in registering their citizenship and the rights that this citizenship provides. There are students with multiple citizenships, and there are implications to be considered because a student may choose to use that citizenship which they consider to be more relevant for them at the point in time when they register. There may be cases of neutralisation, where this occurs it would mean an increase in the numbers of GF group – the smallest of the groups[91], or possible that an FG student becomes a GG student. The subjective value of particular citizenships is unfortunately beyond the scope of this work, but the potential implications must be acknowledged.

4.9 Differentiating according to nationality and/ or the continental regions

The work also compares the contribution of foreigners, by analysing if there are differences between the countries and regions. There will be limitations encountered in the analyses based on countries due to data protection and possibly small sample sizes. According to the data, some countries such as China, Bulgaria and France are feeder countries for subjects

as there are multiple ways of building and gaining this qualification and it depends upon the programme being applied for. Certain programmes are without extra entrance qualifications apart from their secondary school final exam qualification certificate. Some HEIs have extra criteria which may depend upon the demand of their particular programme.

[91] The GF group are the smallest, and mostly excluded from the analysis, they were the ones with the best rates.

in the Engineering /Social Sciences and Humanities. The definition of the country is based on variable ef9 which is nationality[92]. Pending the data regulations[93] this will be used in the analysis. Otherwise, where possible, differentiations/comparisons will be made according to the regions.

Another dummy variable identified the cases into different regions. This allows for an understanding if there is a temporal development of immigrants according to regions. The regions will be measured with the computed variable Ef9_Regions. This also uses the predefined answers as provided by the federal data research centre. International students, where regional differentiations are made are broken down according to regions:

Europe (W/O Germany)
Africa
North and South America[94]
Asia
Australasia.

The variable about the regions facilitates the analysis of similarities and differences between the different regions. For example, are there differences between the Asian and African regions in the duration of study time required? Or in their choice of degree type? If possible, with the sample, questions about similarities and differences between the different sending African countries and their contribution to the success rates in German HEIs can be analysed. Or analysing if there are differences in their choice of programme diplom/ bachelor and field of study.

4.10 Variables about the Diplom/Bachelor qualification

Analysing student preferences and students' success rates, necessitated identifying what programme the students were registered in and what programme they were examined in. The student dataset records the programme in the variable ef31, in the examination dataset the variable that is selected to identify the examination is ef126. Both variables have the same codes and a very long list of possible courses, these belong to subheadings, and these are aggregated into course type (Destatis 2016), and in the data they are computed into a new variable. In the selection process, in the student data, the bachelor or diplom are selected, as is the case in the

[92] Citizenship and nationality in this sense are based on a normative interpretation which is not without its failings (Kochenov 2018).
[93] The release of the data may be prohibited through small case sizes.
[94] Despite the differences both North and South America are merged in this variable because of the small number of cases.

examination dataset. This reduced dataset provides the sample for creating a synchronised variable of bachelor and diplom.

Using both diplom and bachelor categories facilitated the creation of the synchronised variable that captured, for example, students in either programme and provided proof that the success rates for the diplom and / bachelor are more effectively analysed as one qualification within the university. The results provided proof that the synchronised variable approach incorporating both qualifications can explain movement, and choices of students.

The cohorts with their common endpoint are synchronised according to several other variables that ensure the model has a solid and applicable structure. The diplom was based on the five-year university/TU structure. The model would vary for the universities of applied science[95]. The following paragraphs explain the synthetic variable which pave the way for the cross-cohort models.

4.11 **Creating the synthetic variables with the official statistics - the base model**

This short section focuses on using the official statistics for the creation of the synthetic variables that form our base model[96]. A cross-cohort analysis model was created that incorporated both the diplom and bachelor, combining both degree types into a synthetic variable. Both student datasets and the examination datasets were used for this model.

The base model is for the 10-semester diplom and six-semester bachelor (Bandorski et al 2019b). Theoretically, if the cohort began their diplom in the winter semester 1995/96, plus 10 semesters, this would lead to a tenth semester being in summer semester 2000. If we take the bachelor's degree with a typical six-semester run, then the winter semester starts in 1997/98 would culminate with the summer semester 2000. The idea is to answer: *what are the synthetic success rates*?

This meant seeking out the relevant student registrations in the diplom winter semester 1995/96, and the relevant student registrations in the bachelor winter semester 1997/98. This proved to be less problematic, once the desk research identified the HEIs and their programmes as being with either a six-, or seven-semester winter starter. To create the synthetic variable a scale defining the time slots and the points in time that belonged to the cohorts was created, this was possible because the variables were available in the official statistics datasets.

[95] UAS model was initially planned for this work, but due to access restrictions could not be completed for all three of the fields of study.
[96] This section will explain the variables and the base model.

The synthetic variable starts with point one on the scale. Point one is the first semester of the diplom and point five is the first semester of a bachelor. Both diplom and bachelor have a regular completion time at point ten (see 4.11.1.1.).

4.11.1.1 *Model. 1 Cohort Analysis – Regular Study Time*

	WiSe	SuSe	WiSe	SuSe	WiSe	SuSe	WiSe	SuSe	WiSe	SuSe
Dipl. (10S.)	1	2	3	4	5	6	7	8	9	10
BSc (6 S.)					1	2	3	4	5	6

This model 1 is the base model, for universities/ technical universities with 10-semester diplom/six-semester bachelor.

Model one is based on the concept of HEIs that have a 10-semester diplom and six-semester bachelor. Thus, allowing for the structural analysis with the variables of those Universities and Technical Universities that also introduced the bachelor's in science with regular study time (RST) of six semesters.

However, this analysis defines the successful completion of the cohort within a *total success study time*. The decision being that the given regular study time alone (10-semester diplom/ six-semester bachelor) is an unrealistic way of creating student success rates for the HEIs[97]. Therefore, this work uses the extended student success time and broke this total success study time down into three different points and created the following variables for the respective timeslots:

- Regular study Time (completion within the regular study time of six semesters for the bachelor or 10 semesters for the diplom)
- Regular study Time plus one (plus one extra year after the regular time)
- Regular Study Time plus two (plus a second extra year after the regular time)

For all 13 cohorts, we define success in the cohort as being based on completion of the synthetic programme within a total time. The synthetic total time in illustration 4.11.1.2 is a variable and is a total of the following three variables: RST + (RST +1) + (RST+2). The RST synthetic cohort is 10 semesters for the diplom or six semesters for the bachelor (both finishing in the regular study time at a common point in time), RST + 1 year (Regular Study Time plus 1 year or two semesters) meaning that the diplom exams in this variable are those that belong

[97] The results will reflect this.

to the cohort are those that finish at either the 11th or 12th point in time; the bachelor equivalent for this is the 7th/8th semester of the six-semester bachelor programme, as shown in 4.11.1.2.

The synthetic RST + 2 are the diplom exams that successfully complete at the 13th or 14th point in time, or bachelor exams that completed in the 9th or 10th semester. For example, for cohort one, the synthetic variable, for this particular cohort, can include exams that were successfully completed up to the summer semester of 2002, and for each cohort, a variable was created and defined according to the time of the study programme. The examination dataset was merged so that all possible points in time were taken into consideration. Therefore, to account for all possible exams for the synthetic variable, the analysis draws on data from point one to point 14.

4.11.1.2 *Model. 1 Synthetic Variable -– Regular Study Time*

	WiSe	SuSe	WiSe	SuSe	WiSe	SuSe	WiSe	SuSe	WiSe	SuSe
Dipl. (10S.)	1	2	3	4	5	6	7	8	9	10
BSc (6 S.)					1	2	3	4	5	6
Synth etic.	1	2	3	4	5/1	6/2	7/3	8/4	9/5	10/6

As shown in graph 4.14.1.3 both variables are combined using the diplom and bachelor to create the synthetic variable. We decided to take both bachelor and diplom, not just to ensure that we catch any movement within the one field of study between the two programmes but also to identify if there are differences in preferences for the diplom or the bachelor between the fields of study. It is unrealistic to measure success based upon completion within the regular study time (Bok 2017, Massey et al 2005, Tinto 2012). Hence in accordance with the models (4.11.1.3) success is with the regular study time, regular study time plus one year (RST+1) and a regular study time plus the second year (RST+2).

4.11.1.3 *Model Synthetic Variable -– Regular Study Time + 1; Regular Study Time + 2*

	RST+1	RST+1	RST+2	RST+2
	WiSe	SuSe	WiSe	SuSe
Dipl. (10S.)	11	12	13	14
BSc (6 S.)	7	8	9	10
Synth etic.	´11/7	12/8	13/9	14/10

To create variables for the starters and stayers[98] for each of the individual cohorts the next step was to identify the starters and those still registered beyond the point in time. This entailed using both student and the exam datasets. From the student dataset, the fifteenth semester of the diplom is counted to see how many or what percentage of university diplom students are still registered as a student and have not at that point in time completed their exam. This is also done for the 11th-semester university bachelor students.

The variables are created for the model which functions such that it reads in the student data files, selecting for each cohort those files that are relevant for that cohort. Table 4.11.1.4 shows the starter variables that are identified. Those students that started in the winter semester 1995/1997 are counted into the synthetic variable. This meant, for example, that the model needed to use the winter semester files for 1995 and 1997 and 2002. From which the starter diplom, starter bachelor, stayers diplom/bachelor (15/11th semester) can then be counted.

[98] Stayers are the students that are still registered beyond our temporal definition of success.

4.11.1.4 *Model. Synthetic Variable -– Regular Study Time + 1 Regular Study Time + 2; + still registered in the 15th/11th semester.*

	WiSe	SuSe	WiSe	SuSe	WiSe	SuSe	WiSe	SuSe	WiSe	SuSe	WiSe	SuSe	WiSe	SuSe	WiSe
Dipl. (10S.)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
BSc (6 S.)					1	2	3	4	5	6	7	8	9	10	11
Synth etic.	1	2	3	4	5/1	6/2	7/3	8/4	9/5	10/6	´11/7	12/8	13/9	14/10	15/11

Graph 4.13.1.4 ringing the student data.

The common culmination point is one that allows for commonality and therefore comparability in factors that impact on completion in the said HEI at that point in time. The cohort includes all those students who fulfil the criteria at that point in time, and at the beginning of their study programme. For the examinations using year, month and semester allow for cases to be filtered to ensure that they fit the template[99]. This allows and ensures for staggered incorporation of only those registrations that belong in the cohort and ensures that there is no overlapping. Each cohort has variables that belong to that cohort so that only those cases can be included.

The synthetic variable is a composite of success. That means the student success variables of the HEI diplom courses incorporated all those students who sat an exam from the starting point of the cohort up to and including the 14th semester.

This is not to say that all those students who completed their exams beyond this point were not taken into consideration. Another success rate is based on a different calculation, which included all those who passed the exam even beyond the 14th semester of the diplom– that is to say the total number of exams that belong to that cohort independent of the duration needed for completion (Grözinger and McGrory 2020). For the bachelor students, it means seeking to identify if there are cases beyond the 10th semester that have passed their exam.

By using this variable – ef121 beyond the point in time of total student success the maximum potential of the data is being used. With this the work can identify at least two issues: first, the average length of time and the number of semesters that were needed to complete the diplom/ bachelor, second the number of students that potentially could still finish their respective programmes.

[99] In certain cases where the student is in a higher semester number (2) but theoretically it is the winter semester programmes then they are included in that cohort variable.

One of the advantages of such an approach is that it does not just take one piece of the puzzle but allows for a better understanding of the duration of study time of international students in Germany within HEIs and within their fields of study. Through this analysis, the work presents that the administrative data has plenty of potential and also through the creation of extra variables it extends on the possibilities of the data. Also, the synthetic variables allow for the comparison between international and national students. The international students might appear to be producing different success rates in the bachelor's degrees, and the synchronised variable, hence the work can compare the bachelor and diplom through the synchronised variable. This critically evaluates the position of the bachelor and the diplom within and between HEIs and gives more rounded perspective and comparability between the German and international students, and their interest in the programmes.

The synchronised timing for the finishing of the study programmes removes external differences that may occur if there were different finish times. The cohorts one to thirteen can be described based on the final examined year possible (4.11.1.5).

4.11.1.5 *Cohorts: Cohorts with their final possible year of examination*

Cohort	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	c11	c12	c13
Final Exam Summer Semester	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014

In summary, the synthetic variable is a composite of both degree types, the bachelor and the diplom. Its purpose is to measure success at a time of structural upheaval and thereby ensure that cases that might move between the degree type (whether they must or by choice) are not lost in the calculation. This means that the analysis is based on a model that is applicable in that it measures the programmes, and has the potential to provide for different choices, and also to create a model that can adapt to structural change.

4.11a Expressing Success, Success Rates and Overall Success Rates

Expressing success, success rates and the overall success are the aim of this short section. Success (S), in general, is the sum of the passed exams (PE), based on variable ef135. Success rates (SR) are the sum of exams in ef121 divided into the student starters (StS). The student

starters are calculated based on being in the first semester (ef30). Each cohort (C) is calculated based on the student starters in a particular winter semester.

The success rate for bachelor programmes (bSR) use the sum of the cases (bStS) that start in the bachelor programme and the sum of the bachelor graduates (bS), and then dividing the graduates into the starters. The success rates for the diplom (dSR) use the sum of the cases that start (dStS) and the sum of the diplom graduates for that cohort, again dividing the graduates into the starters. The synthetic success rates (sSR) use the sum of the cases from the bachelor and diplom, and the sum of the bachelor and diplom graduates, dividing the graduates into the starters.

The success rates for each cohort can be depicted such that the cohort is based on the year of reporting and the semester (ef30 for StS; ef121 for PE) the success rates can be assigned to a particular group or cohort (C), and each cohort grouping differs according to the point of completion, for example, the first cohort's final completion are possible up to the summer semester of 2002, hence that cohort group's member are elements such that the completers are

$$\in C^{2002}$$

and the synthetic success rates for cohort one are

$$C^{2002} \in (sSR^{1} = (\sum bPE^{2002} + \sum dPE^{2002}) / (\sum b^{1997}StS + \sum d^{1995}StS))$$

Therefore, for each cohort their success rates are calculated based on a summation of the cases in bachelor and diplom programmes at the relevant starting and finishing times. The overall success rate is the mean of the success rates such that in this case the overall success rate is first calculated for each cohort and then the simple average is calculated:

$$oSR = (1/13)(SR_1 + SR_2 + SR_3 \ldots SR_{13}).$$

This provides a very general picture of the different student groupings over the course of the 13 cohorts.

4.12 Variables for counts of students in the different semesters

Tinto (2012) pointed out that one of the most important phases in the study programme is during the first semesters/ year. By looking at the frequencies of the students in the first, third, fifth, seventh and ninth semester, the analysis takes into account not just the success rates, but

also the ability of the HEI to retain students beyond, the first semester, and most importantly between the first and third semester. The rates of those students who remain in the HEI's third/fifth/seventh semester in the diplom or bachelor can be traced, and the results strengthen the arguments made as a result of the cohort analysis. Therefore, again reiterating the wealth of information and approaches that can be taken through the variables in the datasets.

The variable ef30 in the student datasets records the semester that the student is registered in. Using that in conjunction with the year of reporting means that the model can count the students that are in their first/third/fifth semester. By selecting the respective datasets then we can analyse how many students are in the respective semester and the respective time. Using administrative data's variable ef30[100] in the student data gives the numbers of semesters for the present study programme. In the examination data, the relevant variable is ef121, as this gives the semesters recorded at the time of the examination in the respective study programme. This allows the work to identify if there is a trend because it takes a period from 1995 to 2015. The time, timespan, and trends are a part of the analysis and addressing transitions from and between degree types or even HEIs.

There are, however, a number of issues with some of the variables. For example, ef30 and ef121 in the examination dataset should theoretically record the same number of semesters, but they are not always the same. The differences in the majority of the cases are only one semester. This could indicate a difference in administration (Bandorski et al 2019a), for example, if the student sat the final exam in August, and by the time all the formalities were completed and processed, the student is registered as having passed the exam in September, however, in this example, September is the start of the winter semester. This was dealt with by creating a buffer in the calculation – so that in such a case the student is counted in August (in this example it would be a Summer Semester).

The variable ef133 (year of exam in the exam file only) and the variable ef3 (reporting year) also show differences of, in general, one semester, therefore the variable ef133 is the one that is considered. To align the students' exam according to the correct semester, the variable ef132 was included, which is the month when the student completed the exam. By using both month and year and the final exam, the model could align the student according to their HEI being a Winter Semester starter in August, September, or October, and this was useful in particular with the differences between many Universities and Universities of Applied

[100] Fachsemester at the point of recording the data – that is the number of semesters in that subject, and this variable is present in both the student dataset and the examination dataset.

Sciences[101]. Also, in order to ensure that the students were full-time (ef29) and in attendance (ef28) programmes with particular subjects (ef32) the selection procedure then included those cases based upon these variables, in the student data, the same variables were used in the exam data.

Also, because the model uses both the diplom and bachelor fields of study in our synthetic variable the work avoids losing students that might move from the bachelor to the diplom or from the diplom to the bachelor. With the synthetic variable, the model can also identify the synthetic rates of students in these respective semesters, as opposed to an isolated analysis of the diplom or the bachelor which would neglect the possibility of movement between degree type.

The model (0) is flexible because it is based on the starting year, for both bachelor and diplom, which is staggered. This means the respective starting years have to be sought out and synchronised, which necessitates going to the starting year and identifying the starting year for the particular cohort. This allows for cohorts to be aggregated at different levels, and for the dropout or uptake at particular semesters by particular groups. Therefore, by collecting the data in a synchronised variable the work addresses the success rates of both degree programmes, this is particularly important at a time of when the HEIs were in transition from diplom to bachelor.

4.13 Transfers

The data – both student and exam – have a variable recording the first German HEI registrations. This is used to identify if the student transferred. Research has shown (Grözinger McGrory 2020) that by using this variable in measuring success rates that the movement is overwhelmingly from a university to a university of applied science, and this move precedes their final exam. There was no identifiable difference in the behaviour of German and international students. This is relevant, but beyond the scope of this work.

4.14 Interim summary of the variables

The datasets – both student and examination provide an array of information. They record in what semester the student is in, how many semesters the students did in German HEIs, what type of exam the student is registered for, gender, age, citizenship, place of where the

[101] The information concerning when the university or university of applied sciences' winter semester began was desk research and not available in the official statistics (Bandorski et al 2019).

student received the university entrance qualification, type of HEI, and whether the student was in a different university previously. In addition, the examination datasets provide the final grade and the exam for which the grade was awarded, the month and year of the examination. All of which lend to the understanding why this data is viable for measuring student success rates. Furthermore, this source of information provides data at different levels, and with the usage of time it allows for temporal developments or trends to be analysed. The provision of data to the public allows for an assessment of the demographical developments in Germany, which contributes to analysing if there are demographical trends, based on the variables recording time, and this in turn is relevant for the labour market. Therefore, the following chapter will provide data that presents the choice of fields of study, and the development HEI landscape in Germany in general. This reflects work from the literature review, and also why the fields of study and degree types are suitable for the analysis of international students' success rates in Germany's HEIs. The following pages will present the data that the FDZ released for us. All of the following graphs and tables are own calculations[102] unless otherwise stated.

[102] Under the illustration is "Source FDZ own illustration"

5 The Cases

5.1 Introduction

The previous chapters reviewed what tools are available in the official statistics – the concept of official data, the different variables, their potential contribution to research and the challenges that we have to face in using the administrative data. Furthermore, the work looked at the variables and how these are used to create the base model for our cross-cohort analysis. Chapter six will present the data from the official statistics data. This chapter bridges the two by presenting data mostly from the Destatis webpage, this leads to further explaining the method used in creating the cross-cohort analysis and presenting data that substantiates this author's choice in the sample of fields of study and period of research. This chapter thereby solidifies the explanation of the methodology by using administrative data, and why this form of data facilitates a quantitative analysis in measuring students' success rates. Moreover, it also furthers the explanation about why the particular fields of study were chosen, in order to answer what are the international students' success rates in the respective fields of study in Germany.

This secondary source (Destatis) of data provides ample information (Beck, 2007). The datasets include all registrations. Previous chapters presented the absolute numbers and growth of the student corpus over the course of the last two decades. The number of students is closing in on the three million mark. The different areas of study are broken down accordingly (see 4.6) – so that we have areas of study, which include fields of study, as explained in chapter four. First, illustration 5.1.1.1 proceeds with the two most populated areas of study.

5.1.1.1 *The subject areas as a part of the student corpus* [103]

Areas (all students)	WS 2016/17	WS 2017/18	WS 2018/19
Law, economics, and social sciences	1025852	1048789	1066411
Engineering Sciences	763354	769085	774552
Sub total	1789206	1817874	1840963
Of Total No of Registrations	2807010	2844978	2868222

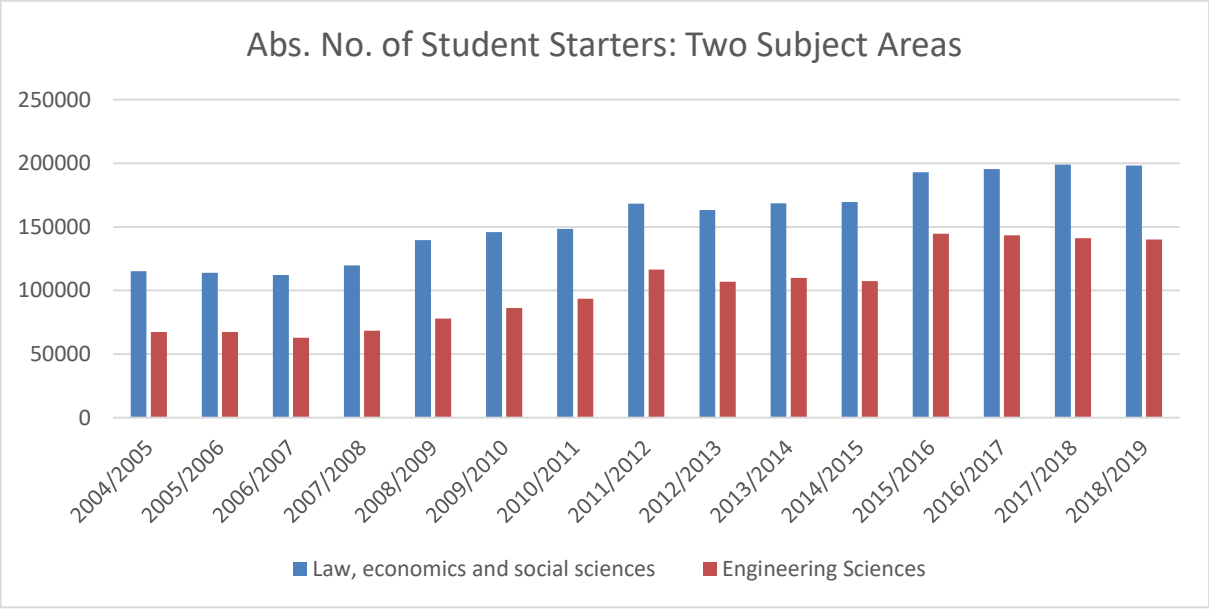
Source: Destatis (2019)

[103] Table: OT, table from Destatis

Table 5.1.1.1. uses the Destatis official statistics: Their webpage shows various developments – for example, if by specifically focusing on the areas of study that will be used in this work, the relevance of these areas in terms of the sheer number of students in those areas over the last number of years will become more evident. The categories in 5.1.1.2 show two of ten different subject areas in accordance with the codebook: a) Law, Economics, and Social Sciences, and b) Engineering Sciences. This latter area includes STEM fields of study such as Mechanical Engineering and Electrical Engineering. The former includes economics and business management students.

In 2018/ 19 a little less than two million of the students were in the engineering and law, economics, and social sciences subject areas. "A growing number of higher education institutions are offering a range of European-oriented special graduate study courses, especially in law, economics and engineering." (Eurydice 2021 p.1). These serve to educate and graduate students for the regional and European labour market and have the growing potential to attract international students. All the more reason to understand the HEIs' success rates of the international and national students in these fields of study on a temporal basis also because if we take a look at the student starters in these two areas the graph shows a stagnation in the engineering sciences student starters' registrations from 2015/16 up to 2018/19 winter semester.

5.1.1.2 *Absolute number of the subject areas' student starters*



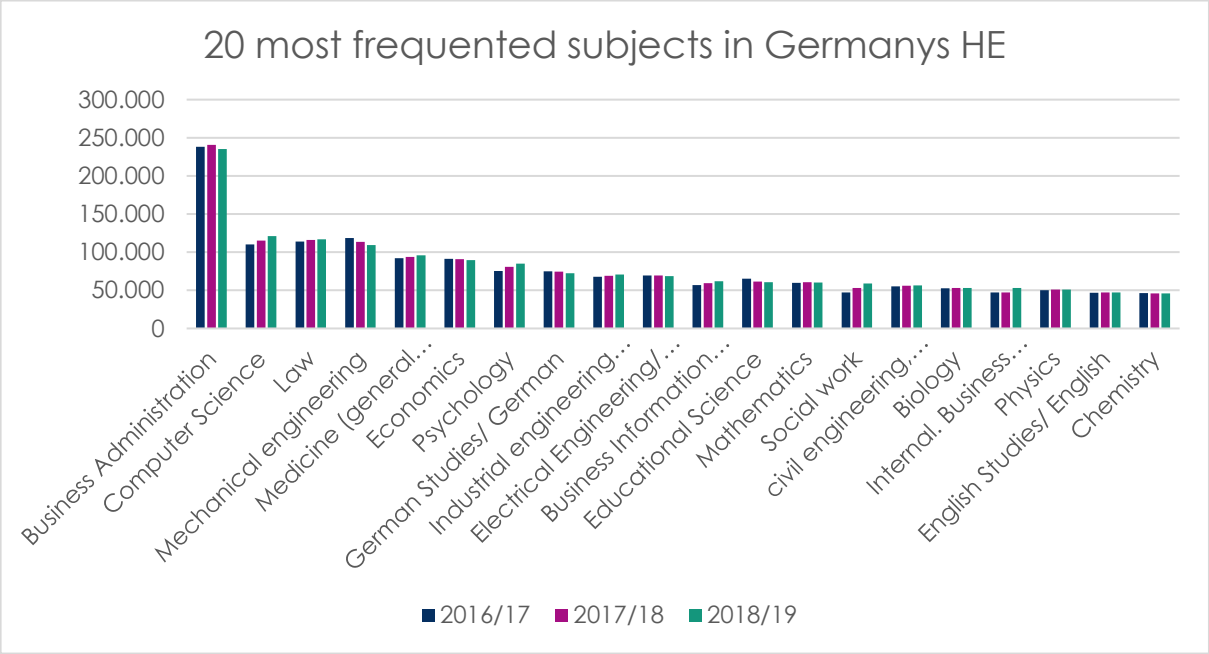
Source: Destatis 2019

5.2 Popular subjects and choice of fields of study

International students' choice of destination is, amongst others, based on where they can access their programme. Graph 5.2.1.1 depicts the number of students registered in the winter semesters 2016/17, 2017/18 and 2018/19 in the twenty most frequented subjects in Germany. Business management, which is a part of the economics field of study, is consistently the most frequented subject. Mechanical engineering was the second most frequented in 2016/17. Not only this, mechanical engineering as a subject is one of the oldest subjects (Zhang Yang 2020), and is therefore, also from what the literature reviewed, a subject that attracts a particular type of student. Although also quite old, electrical engineering, does not precede mechanical engineering, and was not as widespread (Valivach 2009). Over these three years, presented is a picture of decline in mechanical engineering and an increase in student registration in computer science. However, these are based on the subjects, whereby a number of the subjects in the graph are within one field of study (e.g., Business administration and economics). Germany's most popular programmes include mechanical engineering, electrical engineering and economics and business management as fields of study. The latter, in particular, is globally attractive for the international student (Rienties et al 2011), and it is the most populated field of study in Germany. Furthermore, one of the most frequented subjects in the graph includes international management, and from the graph it is also visible that this subject has had an increase in frequencies, with the most recent year showing a visible increase in registrations. Hence, the graph confirms the decision to build the sample based on the fields of study that included the subjects, business management and mechanical engineering. Fortunately, this work has access to the official statistics covering a spectrum of twenty years, and this paves the way for an analysis asking whether our fields are maintaining their attraction for the students – German and International alike. Whether some fields of study lose their popularity[104], and to what extent external factors impact on the popularity of subjects will be discussed in the following chapters.

[104] Whereby popular here means that it is in high demand highly frequented.

5.2.1.1 *Twenty most frequented student registrations in subjects in Germany WS 2016/17/18.*



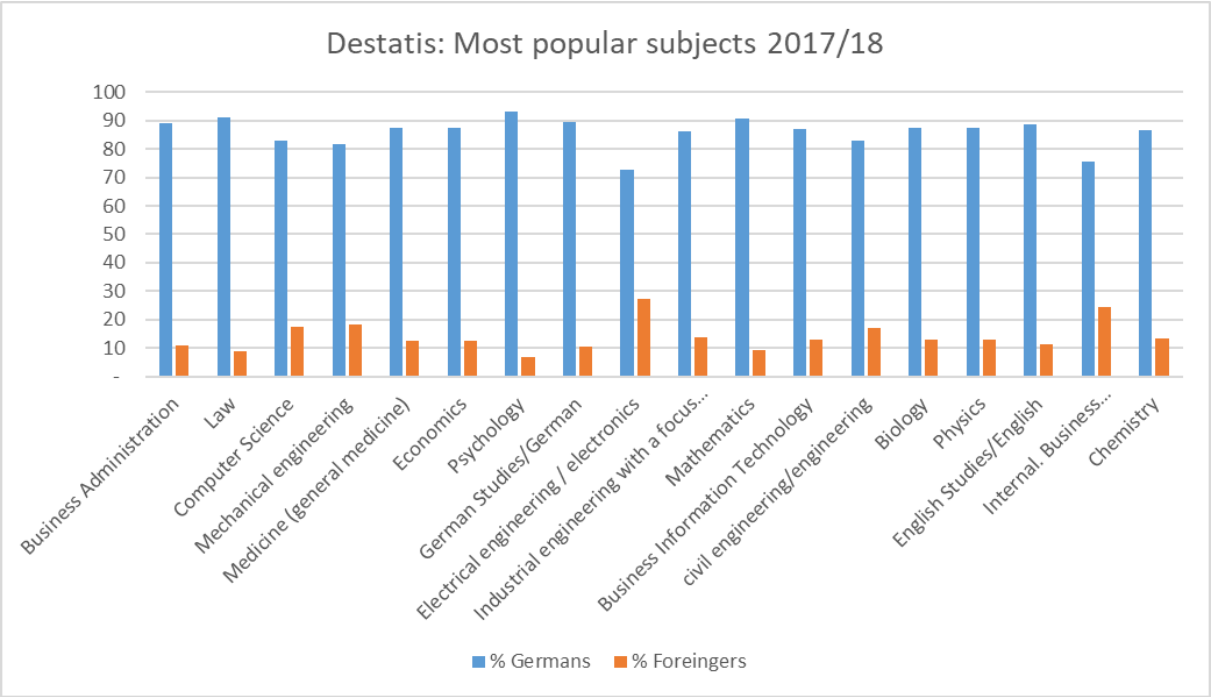
Source: Destatis– absolute number of registered students in 2016/17; 2017/18; 2018/19 – o.T.

5.3 The relation of national and international students per subjects

The breakdown in each of the different subjects according to international / national students indicated that the management subjects had a comparatively higher frequency of international students to that of other subjects 5.3.1.1 and that electrical technician/engineering is also highly frequented by the international students. The graphs are based on the most popular / or most frequented subjects in Germany in the winter semester of 2017/2018. The data show the preference for computer science, electrical engineering, international business, and mechanical engineering. The broad scope of subject names and interests clouds the overall perspective because there may be more switching amongst subjects, and the graph 5.3.1.1. omits the accumulated registrations for mechanical engineering as a field of study with its twenty-plus subjects. Which is another reason for opting for the field of study as opposed to the subject[105].

[105] Graph 5.3.1.1 is based on subjects – mechanical engineering, as a field of study as over twenty different subjects that belong to the field, electrical engineering has less, but Econ also has more than ten subjects.

5.3.1.1 *Distribution of National and International students in WiSe 2017/2018 in the various subjects.*



Source: Destatis; own translation[106]

5.4 HEIs and international students

The 2017/2018 data (Destatis 2018) from the Bundesstatistics included the twenty most frequented universities' first semester registrations and included the data for the foreign students (here indicating foreigners and international). The most frequented HEIs – those with the highest number of students in 2017/2018 semester, and based on first semester students included the following: TU Munich, TH Aachen, FU Berlin, University of Munich, TU Berlin, University of Duisburg-Essen, University of Frankfurt a.M., University of Cologne, University Erlangen-Nuremberg, University of Hamburg, University of Bochum, University of Bonn, Humboldt-University of Berlin, University of Düsseldorf, University of Münster, University of Mainz, and the University of Applied Science Baden-Württemberg, Stuttgart. The Fern University Hagen was the most populated HEI. The TU Munich, TH Aachen, and the University Munich were the top three most populated by foreign students.

Those HEIs that had a six-semester bachelor winter-starter were included in the sample and in one or more of our fields of study. However, from the aforementioned HEIs a number

[106] Taking the winter semester 2017/18 was based on taking the middle of the three years 2016/17/18.

of them also had winter/summer starters: Frankfurt-am-Main, University of Cologne, University of Bochum, University of Bonn. Therefore, they did not conform to the model. This is also the reason for not including the universities of applied science: on a general level there are UAS with winter/summer starters, and seven semesters which means they also need a different model. Furthermore, in the calculations carried out by the federal data research centres, their data presents the international and foreigners as a group. The UAS attract international students, but as discussed in the literature (see chapter 2 and chapter 3) international students prefer the university as opposed to the university of applied science. The actual numbers of international and foreign students are listed below (5.4.1.1) according to university of applied science/ university.

5.4.1.1 *University type: University/ UAS WS 2019/20*[107]

German/ Non-German	UAS	Uni
German	891946	1483432
Foreign	131200	266302

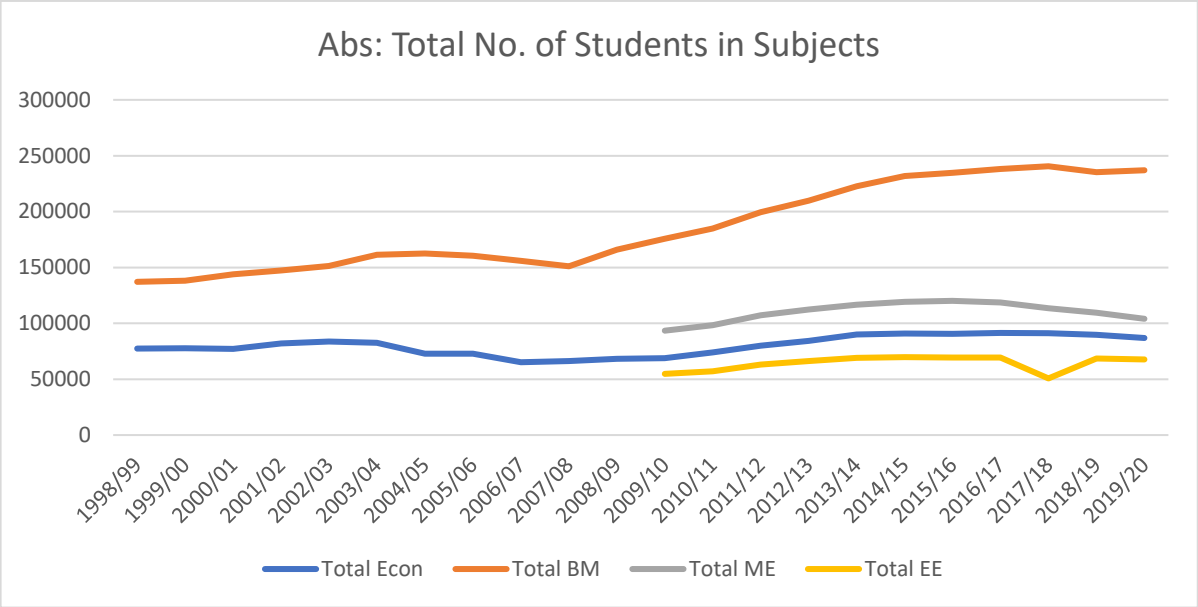
Source: Destatis (2019 p.12)

For example, in the section on mechanical engineering and economics and business management a sample of the data is presented with individual HEIs. In such cases the individual HEIs are either based on, for example, two HEIs in the city of Munich. The purpose is to show both the comparability and differences– where HEIs present similar and also very different results. Some of the HEIs in the engineering fields have high levels of diverse international students (Grözinger 2009).

Graph 5.4.1.2 shows the total number of registered students in the more frequented subjects and their registration development over time.

[107] Statistisches Bundesamt, Fachserie 11, Reihe 4.1, WS 2019/2020 (p.12).

5.4.1.2 *Student Registrations -1993-2018 – the absolute numbers of registrations in four subjects*



Source: Destatis (the graph is based on subjects and not field of study)

To take a closer look, at particularly attractive subjects, graph 5.4.1.2 shows the number of students in mechanical engineering and electrical engineering, business administration and economics. The illustration shows the frequency of students, counting winter-semester only students. The importance of using these subjects is also to observe their increasing attraction over a period of time, and whether their increased attraction is visible amongst the groups: Germany, International and Foreign-German students, and how the duration of the programmes differ over time in each of the different field so study, between the different groups of students. For all but one of the subjects, the latter years show a decline in registrations. Only business management maintains a growth in registrations. It is also this that provides a greater attraction to international students.

Germany is actively seeking qualified labour in STEM areas (DAAD 2018), and graph 5.4.1.2 presents the situation of the two STEM subjects in the STEM fields that will be analysed – mechanical and electrical engineering. Their relevance will be further analysed in chapter six and seven, however here the situation in Germany is presented, and the need to understand the success rates and the German students' success rates will be compared with those of the international student success rates in Germany's HEIs. The analysis clearly differentiates between non-German migrant and international students which was quintessential for the analysis of the given datasets. The time frame presented here shows that in the last number of years there is a decline in frequencies in these fields amongst students in general. This decline

in absolute numbers of registrations reflects the developments in the demographics and the challenges that the local, regional, and national labour markets are facing. Seeking qualified labour may increasingly be a problem if the numbers for these fields continue to decline.

Therefore, the datasets that will be used are suitable for research the research question and delving into the analysis. Moreover, if and where the success rates are considered low, then does that build apathy amongst students? In the *Struggle to reform our colleges* Bok (2017) stresses the changing attitude toward student graduation. This changing attitude is a reflection of the needs of the labour market, and that previous positions did not require a HE qualification, therefore the consequences of low graduation rates did not negatively impact on the labour market.

5.5 The proportion of international students according to the region of origin in different FoS

The international students are diverse: in their interests and in where they come from. The academic cultural diversity is different in each of the fields of study. To ensure that the fields of study are attracting different cultures, and so that the fields of study attract a heterogenous international student body the following table presents the results of one cohort – the sample uses cohort 12, which is one of the more recent cohorts but also a cohort that had diplom and bachelor programmes running parallel to each other. The comparability of the international and German success rates requires addressing the different international students' regions of origins, and whether these students from the different regions have different interests in the most frequented fields of study. Whether students from a different region contribute to the success rates of a particular field, and whether they can complete the programme, is of interest. Different international students' regions of origin may contribute to the success rates. Therefore, knowing the differences of interest according to region of origin is important, and what they choose to study can inform us about what programmes attract what type of international student and how this group manage to contribute to the success rates. The following table (5.5.1.1) shows the breakdown of region of origin.

5.5.1.1 *Source: Cohort 12 distribution of international students in different fields of study.*

Field of Study	% 1st Sem. Bachelor and Diplom registrations according to region (all HEIs – Cohort 12 only)		
	Europe (w/o DE)	% African registrations	% Asian registrions
Economics & Business Management	70	26	44
Mechanical Engineering	17	31	29
Electrical Engineering and Information Technology	13	43	27
Total in %	100	100	100

Source: FDZ data (without US & Australia due to data protection restrictions)

The table presents data according to the field of study, which is the format that the work will continue to apply. The results support the argument for the choice of fields and the different interests – it is visible that from the regions of origin Economics and Business Management, Mechanical Engineering and Electrical Engineering are relevant. Each of the regions have a different interest in the field of studies: the majority of those European first semester registrations are for the Economics and business management field of study, whereas the African focus is electrical engineering. The Asian focus is also for economics and business management, with an almost equal number of frequencies in mechanical and electrical engineering fields of study. Hence, the choice in these three fields economics and business management, mechanical engineering and electrical engineering extend the spectrum to engineering/ non-engineering and allows for a temporal structural comparability[108].

5.6 **Interim Summary**

This chapter presented data from Destatis' webpage as a preliminary exploration in the differences and potential that the administrative data has to explain structural changes in the German higher education landscape. It also presented the students' choice of study programmes, supporting the argument for the choice of field of studies, and also the region of origin as a comparatum amongst the international students only. The next chapter presents the data, using the administrative data, and the measurement of success rates of mechanical and electrical engineering and economics. These three fields were presented in this chapter as relevant to understanding that there needs to be a measurement of the success rates of these

[108] A follow-up on this work will analyse international students in computer science.

fields over time and in both the diplom and bachelor. The contribution of international success rates, with the official statistics, provides insight into the contribution that this group of students can make to the labour market, either in Germany or elsewhere, and also as graduates with either the bachelor or diplom qualification. Furthermore, it also presents this dataset as a source of information for researching international students' success rates in the three fields of study and comparing subgroups of students studying in Germany.

6 The Data and the Results – Three fields of study

This chapter concentrates on the data from the student and exam datasets. In chapter two this work addressed the retention rates, and that this included assessing (2.5) the ability to retain. The reason for presenting the retention rates is that it contributes to understanding the success rates, therefore, where possible retention rates will be presented. Retention does not have to be limited to the HEI but can also refer to the programme (Hagedorn 2012) and for this reason retention rates of the bachelor and diplom where possible, will be used[109]. This will not be limited to the first-third semester but will follow the development of retention also in the more senior semesters of both the bachelor and the diplom in mechanical engineering.

The three different fields of study will be analysed with the same model for measuring their success rates, however, because of the different nature of each of the fields and data access restrictions, there will be digressions. In general, the data will be analysed according to the following HEI-format levels:[110]

- Mechanical engineering:
  - aggregates of HEIs university and technical university-based sample based on being six-semester winter starter bachelor - comparing GG and FF students,
  - singular cases of HEI comparing GG and FF students.
  - duration of time needed for diplom and bachelor
- Electrical engineering:
  - aggregate HEI for university and technical university based on sample with six-semester bachelor winter starter comparing GG and FF students
  - singular cases of HEI comparing GG and FF students
  - duration of time needed for diplom and bachelor
- Economics:
  - singular HEI for success rates with a sample six-semester bachelor winter starters - size large enough for release; and comparing GG and FF students
  - aggregates of HEIs university sample based on being six-semester winter starter bachelor - comparing GG and FF students,
  - duration of time needed for diplom and bachelor
- A separate analysis of foreign students with German higher education qualification, in mechanical engineering, and economics in 6-semester bachelor programmes per field of study
- Sub-chapter with further analysis
  - Comparing the fields of study
  - Comparing student registrations, time, and success
  - Comparing pass/fail in all fields of study
  - Case study: comparing pass/fail in Economics
  - Gender

[109] Where the retention rates are omitted, it is due to restricted access (electrical engineering).
[110] These formats were used in 2019 publications (Bandorski et al 2019).

- Using only the international students and comparing their regions of origin
- Using only the international students and comparing regions of origin and degree type

6.1 Mechanical Engineering as a field of study:

The following graphs will begin with the student registrations which are based on the student data. These graphs present the development of the bachelor and diplom over time in the sampled seven HEIs[111]. The HEIs in the sample are University Erlangen-Nuremberg; TU Braunschweig; University of Hanover; TU Darmstadt; Karlsruhe Institute for Technology (KIT); University of Stuttgart; TU Munich. The sample includes all those in the acatech report (Klöpping et al 2017) which in turn includes the TU9 universities that fulfilled the criteria of six-semester winter-starter bachelor, with in the case of mechanical engineering University of Erlangen-Nuremberg.

The first graphs that will be presented are based on the data from the HEIs and are grouped and split according to the diplom and bachelor qualifications. By analysing these first, the data will show how the programmes retain the students.

- Diplom – group gg
- Diplom – group FF (international students)
- Bachelor – group gg
- Bachelor – group FF (international students).

The aim is to set the framework for the comparative analysis and compare the absolute numbers of GG-students with the FF-students. In the cohort analysis, the synthetic values will set the scene for the analysis of the success rates in the sampled HEIs.

6.1.1 ME: Absolute number of Students per Semester in Diplom and Bachelor

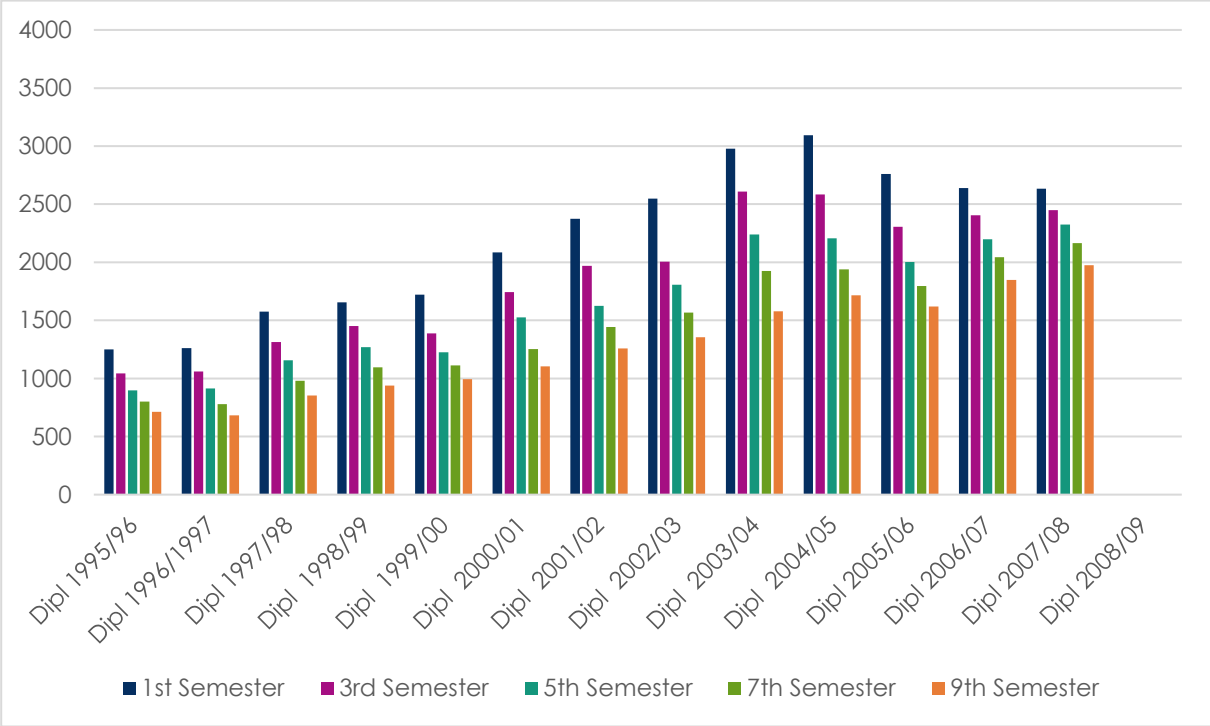
Beginning with the absolute numbers of students, the data graphs the groups' retention rates in the respective programmes. Choosing to display the absolute numbers also allows for an understanding of the number of international students in the fields of study. Displaying the absolute numbers can clarify the movement between the programmes and shows the absolute growth in the uptake of the diplom or bachelor over the course of the analysis. The absolute numbers of international students are, relative to the German students, and in general, small. The graphs show the ability of the HEIs to retain their students from the first to third semesters.

[111] Are with six-semester bachelor. These were included in the acatech study (2017).

However, the data in this section of the analysis include the retention in the more senior semesters. The point is that it allows us to see how both programmes – diplom and bachelor in mechanical engineering are attractive to the students and that the retention is not a clear-cut issue amongst the German and International students, over a period of twenty years.

By addressing retention from first to the third semester, and also the absolute numbers that have continued into the fifth, seventh and ninth-semester illustration 6.1.1.1 presents the development of GG- students registering in their first semester in those seven HEIs between 1995 and 2009. The data includes those students registering in the mechanical engineering diplom and provides a basis for identifying starters in the 10-semester diplom in 1995 and culminating with the 10-semester diplom that starts in 2007.

6.1.1.1 *ME: Diplom - GG- students only – University and Technical University*

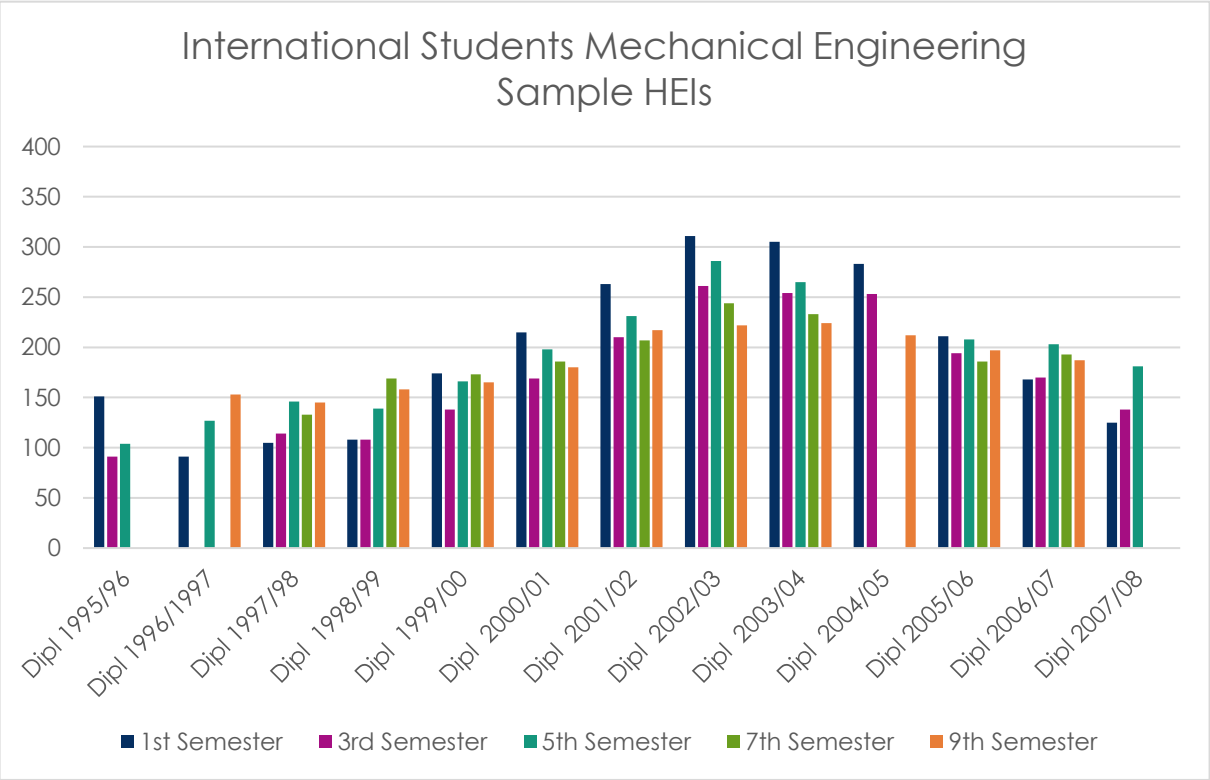


Source: FDZ – Own illustration

Graph 6.1.1.1 shows a stable pattern of increasing numbers of first registrations in the diplom until 2004/05 with 3094 student starters, but thereafter the first registrations begin to decline in number. From the first to the consecutive semesters, we can see declining registrations. From 1999 until 2002/03 the difference between the first and third semester increases. For example, the retention rate (difference from first to the third semester) steadily drops to 78,6% of its first semester students in the 2002/03 diplom group. Thereafter, the retention rate picks up and reaches 93,0% in the latter cohorts. So that in the 2002/2003 cohort

there are 545 students less in the third semester of the diplom than started the programme. Whereas in the more recent cohort there are 183 students less beginning their third semester than the number registered in their first semester.

6.1.1.2 *ME: Diplom - FF-students only – University and Technical University – seven universities*[112]



Source: FDZ – Own illustration

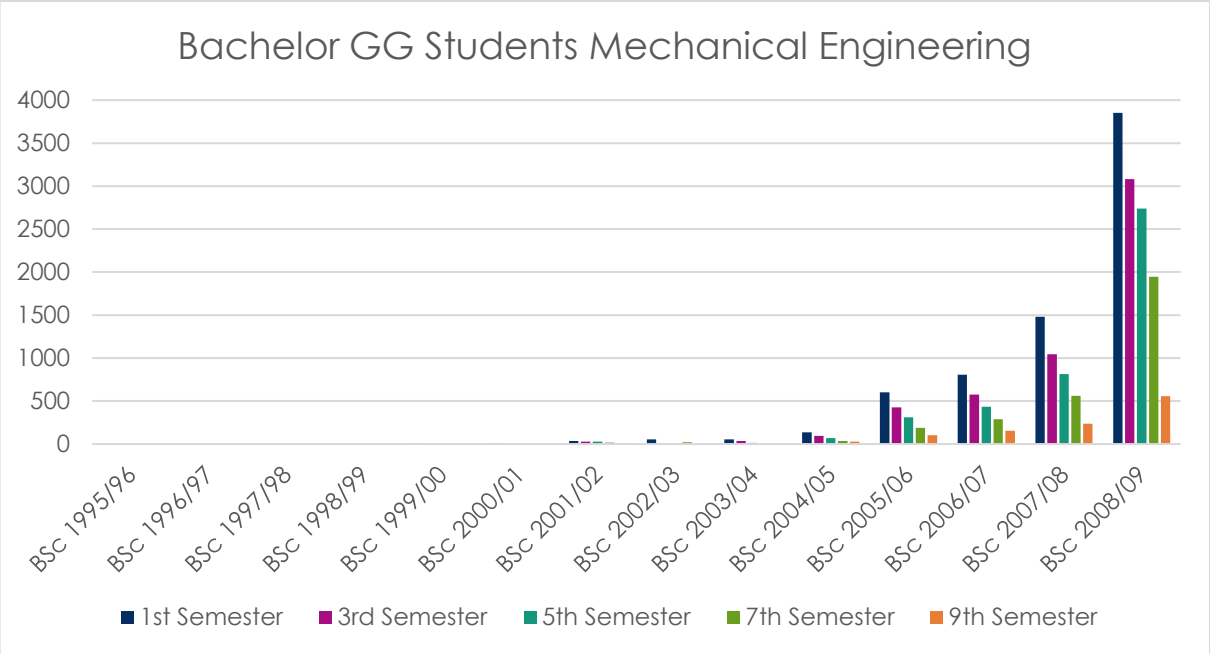
Graph 6.1.1.2 shows the international students registered in the sample of HEIs from 1995 up to 2007/08. Here the picture is somewhat less stable amongst the diplom semester registrations. Unfortunately, some of the bars are missing due to data protection restrictions. The first semester diplom registrations do not consistently increase, but peak with the diplom in 2002/03, thereafter the first registrations in the diplom decline. Contrary to the GG- students, the numbers of registrations in consecutive semesters are not necessarily on the decline – there is no consistent drop from first to the third semester, and there is no consistent drop in the following semesters but rather a tendency for an increase in registrations for the attractive diplom, and in some cases with increasing registrations in the more senior semesters. Where does the increase in numbers come from? Although the earlier or older cohorts' inter-migration

[112] The seven universities include those from the sample with winter semester starters and six-semester bachelor: 10-semester diplom.

may not be explained by the bachelor, one could consider the role of the German "vor-diplom" (MBA 2021) which was an interim qualification which allowed progression to complete the diplom. This could in part explain the movement amongst HEIs where there is a decline from 1st to the 3rd semester and then an increase from the 3rd to the 5th semester. However, let us take a look at the bachelor for the GG-students first.

In general, in the earlier cohorts there are no bachelor registrations in the first semester but then in later semesters registrations emerge. This can also happen in the diplom, it is however less visible because of the larger numbers of those students in the diplom. In particular, in the illustrations with just the FF-students, where the absolute numbers are smaller, the graphs appear more haphazard, and the movement from and to the bachelor is more visible. The covertness surrounding the diplom does not mean that the movement is not there.

6.1.1.3 *ME: German Students, Bachelor, Mechanical Engineering – University and Technical University*



Source: FDZ – Own illustration

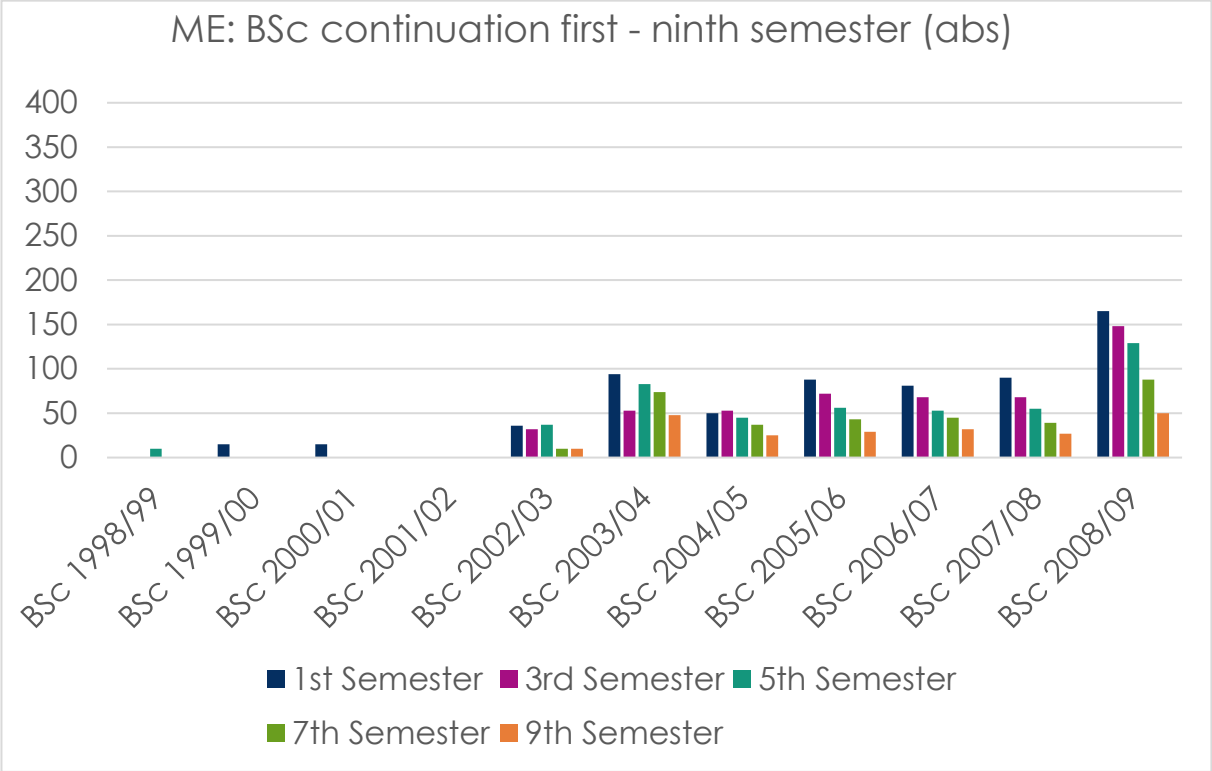
Graph 6.1.1.3 analyses the bachelor GG-students from 1995 to 2015. What emerges are the first counts around 1999/00 (with four cases in the first semester only, and 11 cases in 2000/01 first semester only), but again a very stable picture. A visible pattern emerges in the cohort starting 2004/05 where the first-semester starter registrations are more than the consecutive semesters. In the last presented starter of 2008/09, there is a large drop from the seventh to the ninth semester. This sharp drop after the seventh semester will be explored when looking at the duration of the programme, bearing in mind that the model presented here is

based on the six-semester bachelor and not the seven-semester bachelor with which we would expect that sharp drop. However, if the students completed in the regular study time, we would see this drop between the fifth and seventh and not between the seventh and ninth semester. Unfortunately, students do need longer than the recommended student time as stated by the HEIs (McGrory 2020) which will be addressed later in this chapter.

Graph 6.1.1.4 reflects the bachelor international students, and from 2005 there is a visible pattern, similar to that of the German students. However, the difference between the fifth and seventh and seventh and ninth at first glance would visually appear to be equivalent, indicating the duration of the bachelor to be longer for the international students than the GG-students. The absolute numbers are graphed to allow for a consideration of the actual numbers registered, and consideration for the smaller numbers of students that belong to this category. In the earlier years (international students starting in 1995) the presence of the international students and their retention rates are in this early-bachelor-phase quite erratic, this is reflected in the increasing number of bachelor beginners who then disappear. Simultaneously there are registration inflationary rates in the later semesters of the diplom (6.1.1.2)[113]. The registrations cannot rule out movement in either direction – between the diplom and the bachelor. Nonetheless, that the diplom remains attractive would have been undetected if we had not included a synthetic variable to recount the success rates of national and international students.

[113] Further research showed using the semester registrations that there is an increase in the TUM diplom registrations in the more senior semesters, and a decline in the bachelor students' registrations (Bandorski et al 2019b).

6.1.1.4 *ME: FF- Bachelor 6 Semester programme – University and Technical University*



Source: FDZ – Own illustration

6.1.2 ME: Cohorts Starters

Staying at college[114] does not mean that you necessarily pass your exams, so how do the registration numbers shown in the previous graphs convert into success rates? The following shows the success rates of the groups in the same HEIs. Let us start with the synthetic cohort variable so that it sets the framework for an understanding of those first semester students as an absolute number in the GG and FF students' groupings. The previous chapters explained the definition used to measure success, and these success rates were calculated based on the presented method which will be presented in the charts with the synthetic first registrations in the thirteen cohorts.

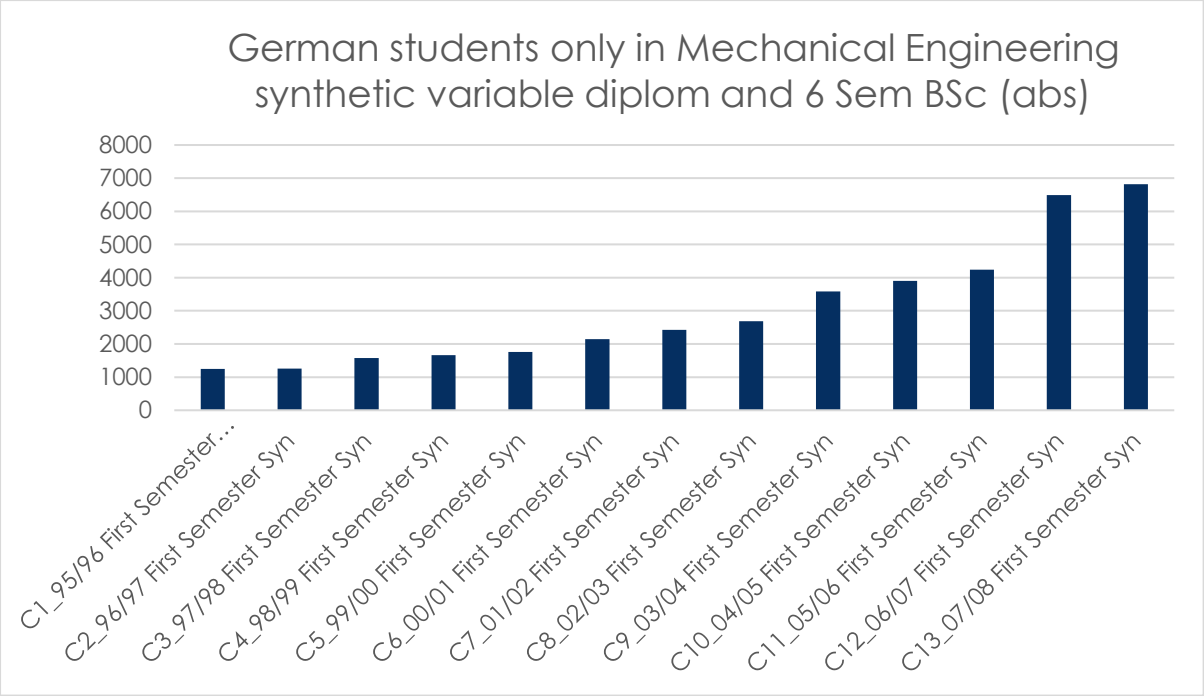
The synthetic variables tell a story of moderate success, it covers the inflationary success of the diplom, possibly at a cost to the bachelor. Using the student statistics to follow registrations sheds insight into the choices that international students have made, in this part of the chapter, focusing on their choices for mechanical engineering. The following graph (6.1.2.1) shows growth in student registrations in our sample of HEIs. The graph depicts the synthetic variable with ME German students registered in their first semester. This still refers to all full-

[114] College being the generic term for a type of institution providing higher education.

time students in the given HEIs. There is a steep increase in student registrations in the 12th and 13th cohort starters, starting 2006/08; 2007/09.

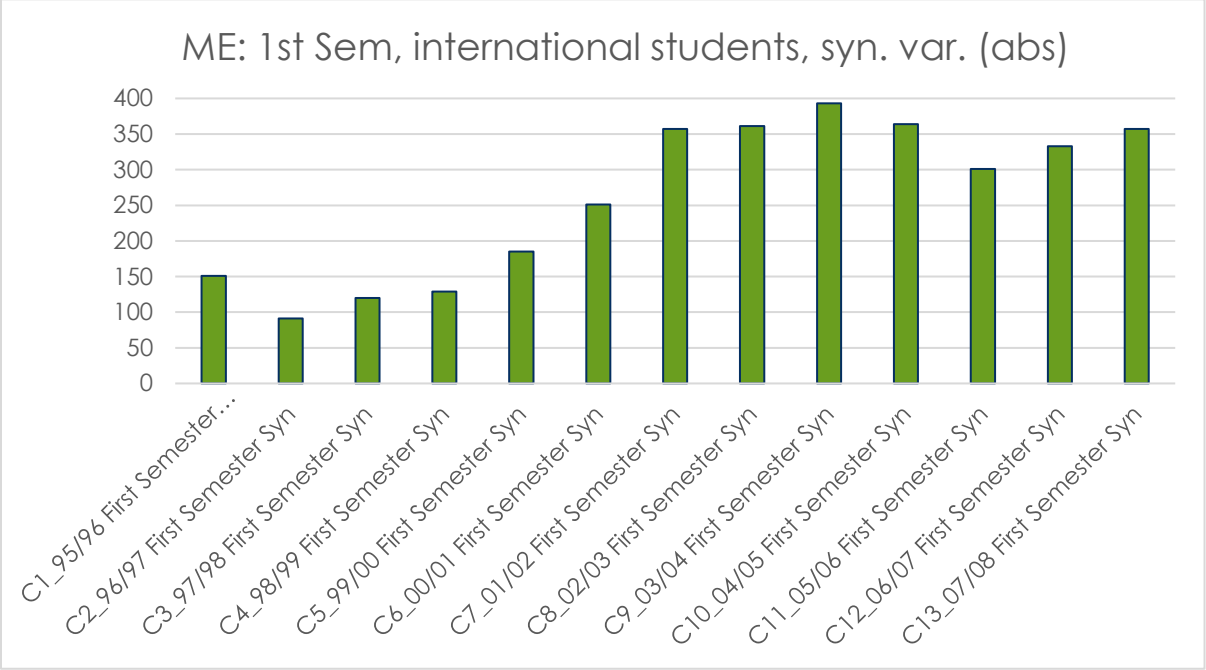
Figure 6.1.2.2 charts the FF – students with the synthetic variable, so it also includes both bachelor and diplom students. The graph illustrates a peak around 2003/04 diplom starters / 2005/06 bachelor starters. It is in the younger cohorts (winter semester 2008/9 and 2009/10 (C12 and C13)) that the FF-students synthetic variables do not show a noticeable increase in the numbers of first semester registrations, but rather the peak is around cohort nine, thereafter there is a dip and stagnation in the numbers of first registrations.

6.1.2.1 *ME: Synthetic Diplom and Bachelor – German First Semester Students -– University and Technical University*



Source: FDZ – Own illustration

6.1.2.2 *ME: Synthetic Diplom and Bachelor – international students – Uni/ T. University*

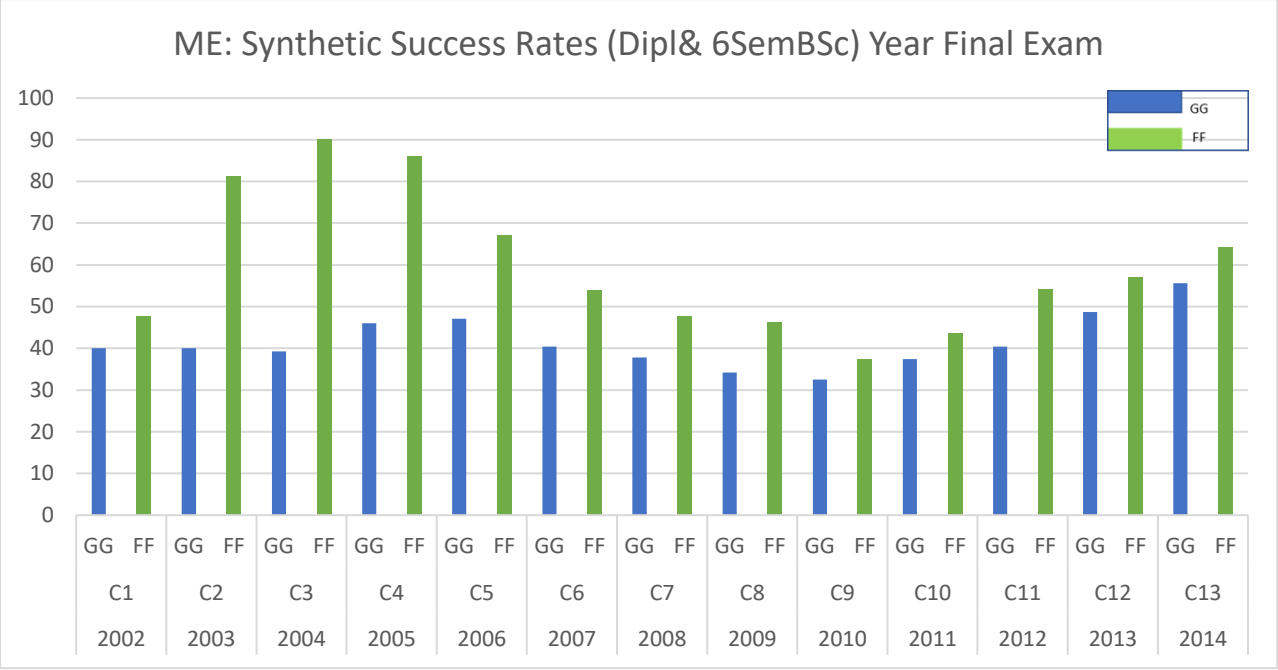


Source: FDZ – Own illustration

6.1.3 ME: Cohorts Synthetic Success Rates

Figure 6.1.3.1 displays the success rates of the two different groups of students over twenty years. As explained, the success rates include RST + (RST+1) + (RST+2). The absolute actual numbers for the semester starters of the groups can be read from the previous graphs 6.1.2.1 and 6.1.2.2. The absolute numbers in the FF- are smaller than the GG-students. The graph depicts the success rates of the synthetic variable from 1995-2015, in all 13 cohorts.

6.1.3.1 *ME Synthetic Variable – GG, FF Students – success rates – U/ TU*



Source: FDZ – Own illustration

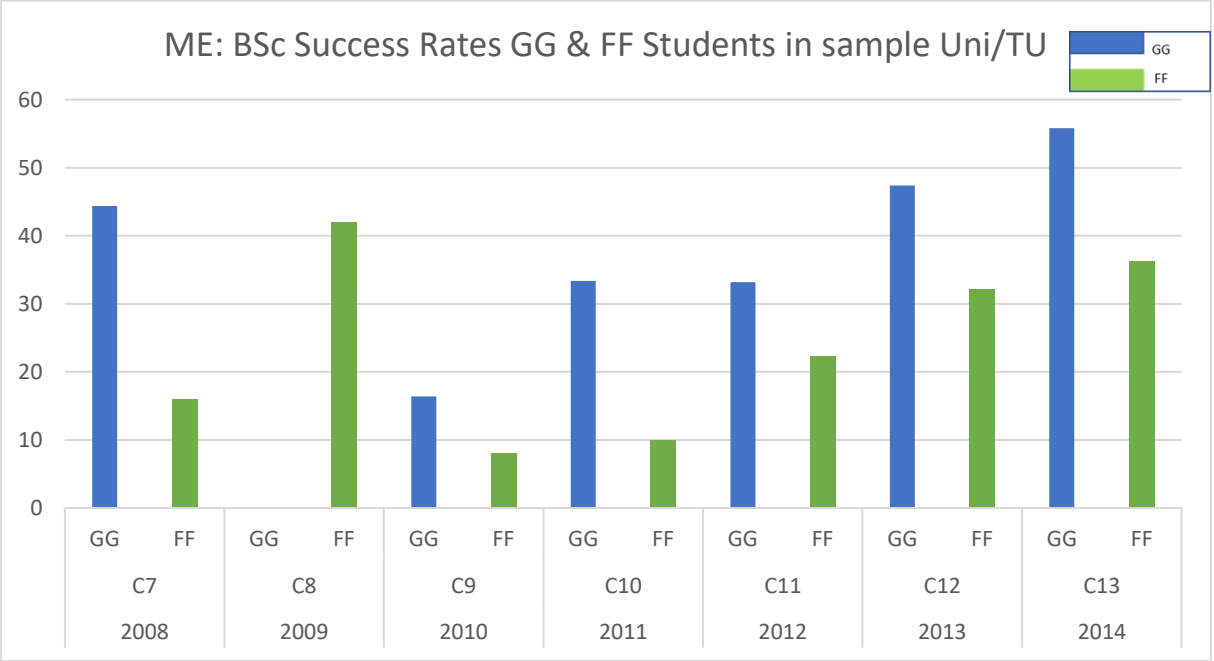
Not in any one of the cohorts do the GG-students produce better success rates than the international students. In the older cohorts, the international students' success rates are comfortably reaching 80%. Using all the data for student starters and all the data for synthetic finishers, the simple average is M = 43,2% for the GG-students as opposed to M = 54,5% for the FF-students. Over the 13 cohorts, the average cohort success rate for the international students is M = 59,7% in comparison to the German students' success rate of M = 41,5%.

So why would previous research think that the international students do not do as well as the German students in HEIs in Germany? Illustration 6.1.3.2 shows the respective success rates of the different groups in the mechanical engineering bachelor's degrees in the same sample of HEIs. First, the graph begins with cohort seven (final exam included 2008), and some bars are missing because the numbers were so small that they could not be released, or because the difference in data release was less than three and would present data protection difficulties.

However, unlike the graph with the synthetic variable, this chart clearly shows that the bars for the international students are lower than the bars for the GG-students. So here, with the success rates for the bachelor's in mechanical engineering, according to the cross-cohort analyses covering a period of twenty years, the data shows that the international students do not fare as well in the bachelor as their German counterparts. One possible explanation is that there is movement from the bachelor, to the diplom by the international students. Another possibility

is that the bachelor international student make-up differs from the diplom international student make-up. Possibly, with the new variables being added to the official statistics from 2017 a concrete explanation could be tested, that could further explain the student make-up.

6.1.3.2 *ME – Bachelor Success Rates – GG, FF Students –U/TU Technical University*



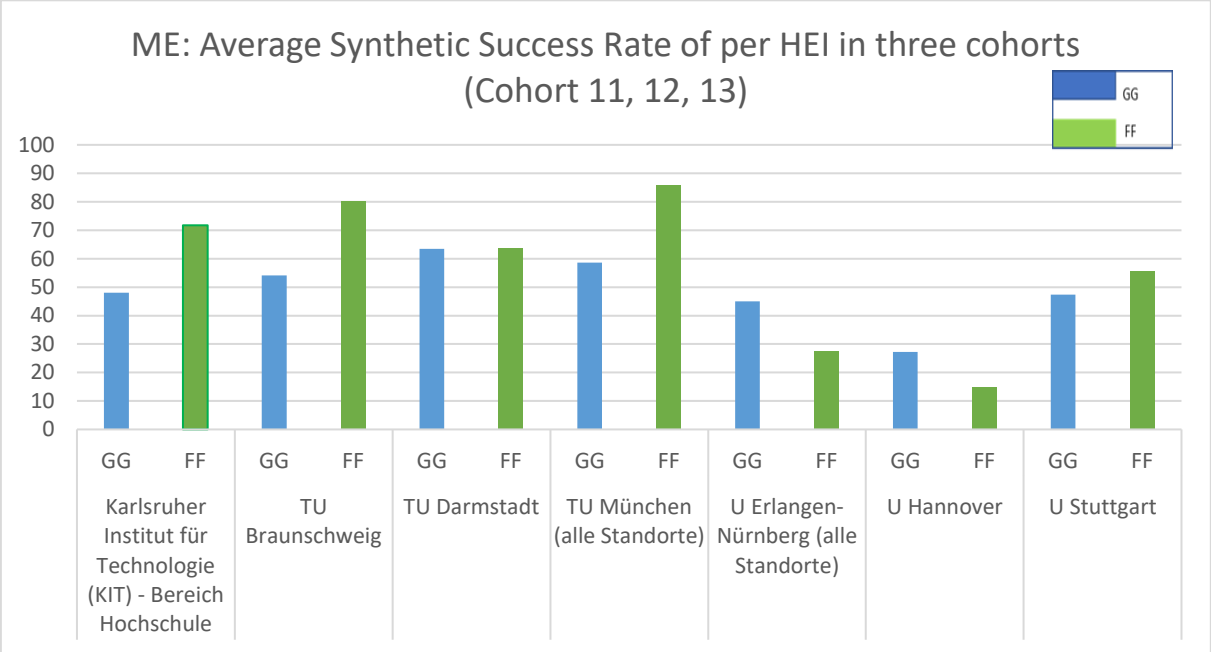
Source: FDZ – Own illustration

6.1.4 ME: Individual HEIs Success Rates

Graph 6.1.3.1. displays the synthetic variable with a sample including seven HEIs in an aggregated form. To see if the better success rates are the result of one particular HEI or how the success rates differ for this group in the individual HEIs an approach was sought to allow for an analysis at the university level. Due to the data restrictions, having the synthetic success rates released for each of the individual HEIs for each cohort was not always possible, nor permissible, for the absolute numbers in some cases were too small, meaning that the results would have been extremely patchy. To overcome this, and present success rates for the individual HEIs, and not limit the results to only those with a larger number of students, the following procedure was taken. The following graph - 6.1.4.1. - presents the average of the three youngest cohorts (cohort 11, 12 and 13) using the average success rates of these three cohorts in mechanical engineering bachelor and diplom programmes, differing the GG-students and the FF-students in seven HEIs. The HEIs and their success rates are graphed. We can see that KiT, has better success rates for the FF-students in comparison to the GG-students.

However, KiT is not alone. TU Braunschweig, TU Munich, and the University of Stuttgart have much better success rates produced by their international students. The TU Darmstadt has both groups on equal footing.

6.1.4.1 *ME: Synthetic Variable – GG and FF Students – success rate – Level HEIs*



Source: FDZ – Own illustraiton

In fact, only Erlangen and Hanover, show better success rates for their GG-students in comparison to the FF-students. In the process of analysing the individual HEIs one particular HEI lead to the author carrying out an individual case analysis: that was the case of KiT. KiT in the individual analysis had an increasing number of French students in the more senior semesters. That means in some individual cohorts (but not all) that there were more French students in the fifth semester than in the third semester[115]. Following desk research and telephone discussions with KiT lead the explanation that KiT belongs to a cooperation programme and has double degrees with other universities. Amongst those are French universities, but not just French universities on the border, they include universities in Paris and on the west coast of France. French students who partake in the double degree programmes with KiT join KiT in, as mentioned, their senior semesters. There are other universities in the programme, but the case of KiT is special and identifiably special in terms of the increasing

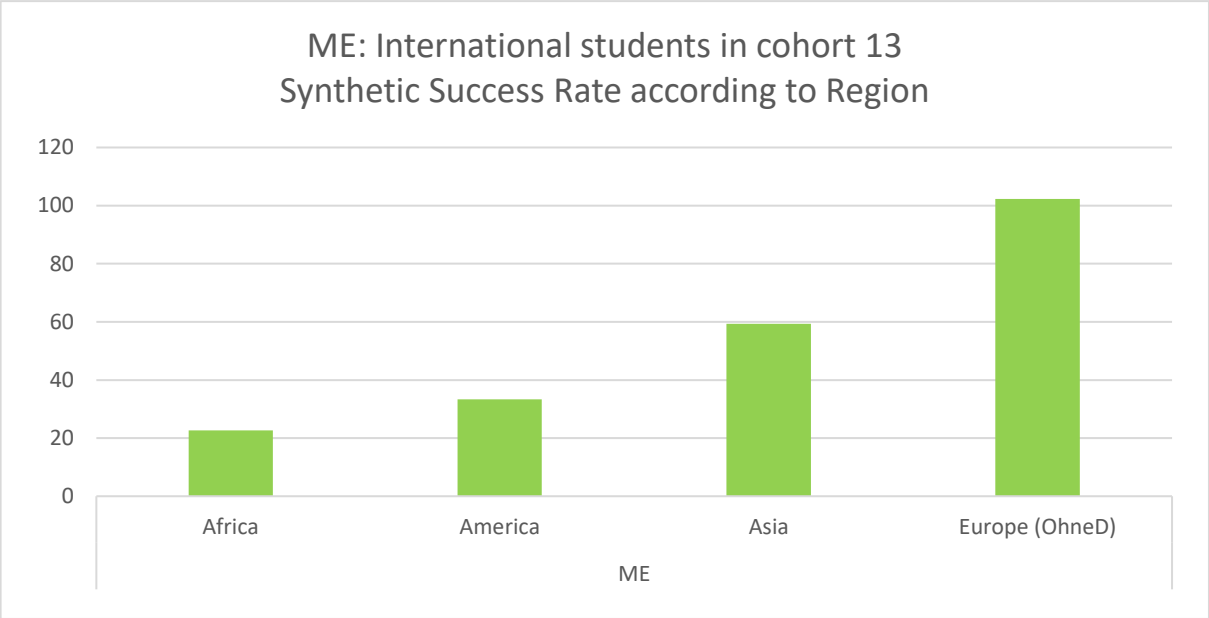
[115] At the time of writing the double degrees in the other HEIs were in MSc. Programmes rather than bachelor programmes. There were double degrees in KiT.

cases that, only the case of KiT where they join from these senior semesters. The process of the analysis was not without its complications because, again the issue of smaller numbers restricts the release of data, and because of the implications that this can have on smaller number of French cases in the starting cohort, and the larger numbers in the more senior semesters. In the analysis, the case of French students was evident in the middle cohorts, and less evident in the older and younger cohorts.

6.1.5 ME: Success Rates according to Region of Origin

Finally, the following graphs the success rates according to the region of origin in mechanical engineering's 13th cohort. Although the work seeks to present multiple cohorts, again the data restrictions present limitations. Graph 6.1.5.1. presents the differences and thereby illustrating that there are differences according to the region of origin. By using cohort 13 the work presents the youngest cohort and therefore one that is well established within the Bologna Process, so the Europeanisation and intercultural acquaintances could play a positive role in the success rates. The role of double degrees could contribute to understanding the success rates of European international students. The Asian students' success rates are similar to the average success rates presented in the previous sub-chapters. What is disconcerting is the situation for African international students. To further explore possible explanations the following sections and the subchapter on further analysis (6.7) will seek possible explanations for the international students' success rates.

6.1.5.1 *ME: Synthetic Success Rates in Cohort 13 according to region*



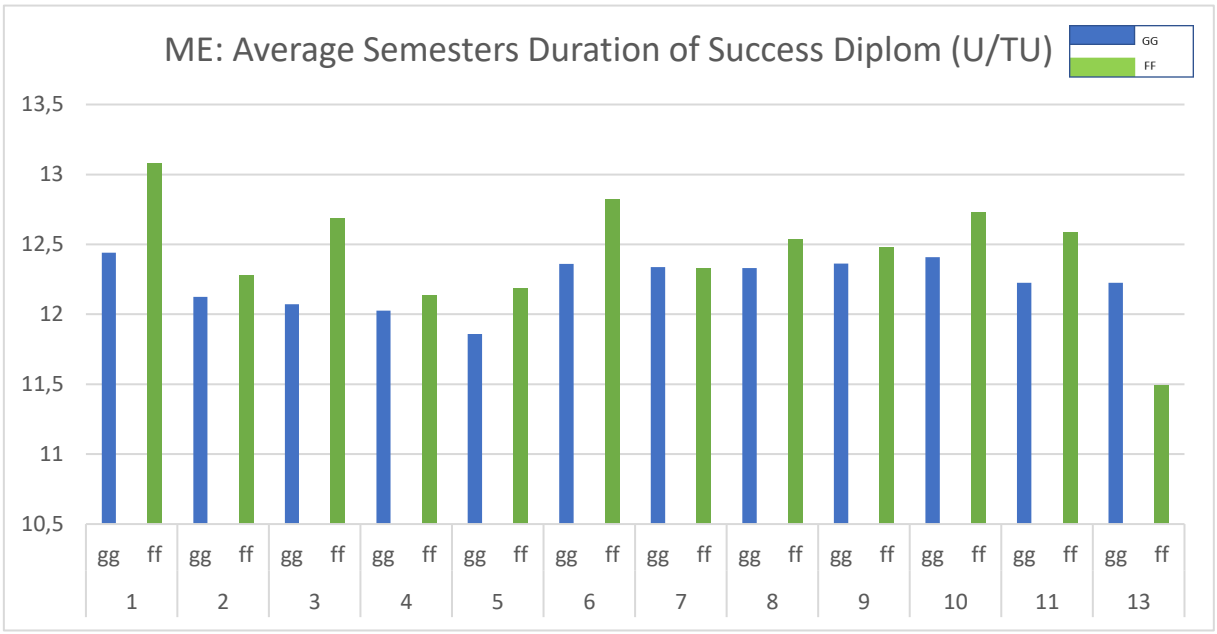
Source: FDZ – Own illustration

6.1.6 ME: Duration of study time

Reducing the study time needed and the number of semesters for qualifying was one of the goals of the Bologna Process, hence by analysing the duration of the numbers of semesters needed to complete the study time this work analyses if the process achieved its aim – the aim of reducing the study time needed to graduate with a mechanical engineering qualification. Furthermore, the purpose of looking at the duration of the study time needed could explain an improvement in the success rates. If, with time, more students can complete their programme in the shorter recommended study time, then the shorter study time could help explain improved success rates. If with the progression of time, more students from a particular group can improve their overall success rates in the bachelor, then the bachelor as a study programme would contribute to improved success rates over time, for that particular group. Or if more programmes introduce a maximum amount of study semesters before introducing or penalising longer study time needed, and if this contributes to improved success rates over time, analysing the study time needed analyses if the policies have been successful. So, looking at the average study time of the bachelor and diplom programmes provides information about the development of time needed in the respective programmes which may or may not impact on success rates.

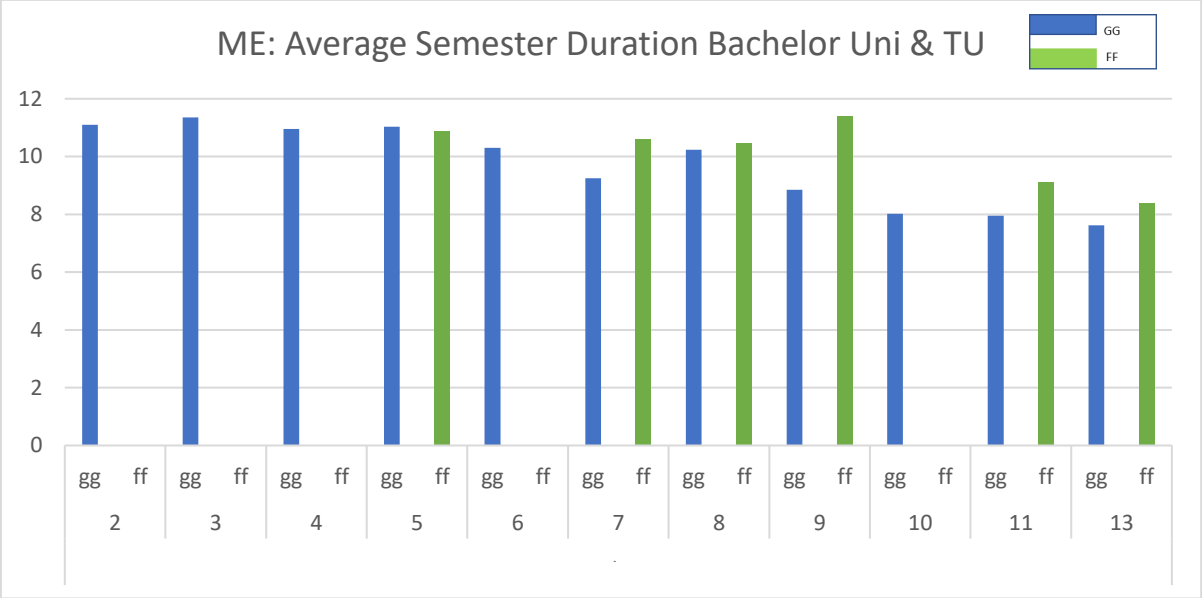
In table 6.1.6.1 we see the average time need of the students for the diplom in mechanical engineering. This is based on the 10-semester diplom in the sample HEIs. For each of these calculations, the extent of dispersion was also measured. The standard deviations showed that the dispersion around the mean values were lowest for the GG-group of students, and the higher standard deviations amongst the international students reflect the diverse capabilities of this heterogenous group. It is still important to remember that the set regular time for this is the diplom with 10 semesters, yet the average time needed is 12 semesters. That is two full semesters more, or one extra year. So, what happens with the bachelor?

6.1.6.1 *ME: Diplom Average Semesters for Student Success University/Technical University*



Source: FDZ – Own illustration

6.1.6.2 *ME: Duration of bachelor in the different cohorts*



Source: FDZ – Own illustration

For the bachelor students (6.1.6.2), with the regular study time of six semesters, we see that the average time for completing the bachelor varies from group to group. The time needed for completion of the diplom was on average over 12 semesters – meaning an extra two semesters are needed to complete the 10-semester programme. For the GG-group of bachelor students, on average, the time needed or taken to complete the bachelor was M = 7,6 semesters, in comparison to the international students that completed with M = 8,9 semesters. Therefore, the GG-students were quite quick with their bachelor's degrees.

Still, none of the groups managed to complete in an average of fewer than seven semesters. The regular study time of six semesters is in accordance with reducing the time needed for the degree and following the aims of the Bologna Process policies (HRK 2020). However, even the GG-students are a far cry from reaching that goal.

6.1.7 ME: HEI preference

In this subsection the analysis takes a special look in mechanical engineering, and the HEIs that offer the programme. This digression from format is especially for mechanical engineering because the data were accessible. In the previous graphs, the success rates of international students were presented at an individual cohort group level, and there were also success rates per HEI. The difference in duration of time for the bachelor and diplom in mechanical engineering according to the region was also presented. The following graphs the

registrations in the different HEIs according to the region of origin. The first-semester international students' distribution, using cohort 12 was chosen because it is a younger cohort, and also still had active diplom courses. Using only one cohort, in this case, was part of the process of the analysis at an earlier stage of the analysis, extracting further cohorts for this analytical level was no longer feasible. However, not all HEIs had sufficient cases in all of the calculations, which meant they had to be excluded from the table. Table 6.1.7.1 breaks down the percentage of first-semester students in the HEIs according. Due to data protection some of the values could not be released, these are left empty in the table, and in such a case the percentage was totalled based on the values that were released, meaning only the cases that could be released or used in this table are counted as valid, the rest or empty cases are considered as missing.

6.1.7.1 *ME: Percentages of first-semester international students according to region and HEI in Cohort 12*[116].

Cohort 12 - Syn Semester Starter	Erlangen-Nuremburg	TU Darmstadt	KiT	U Stuttgart	TUM
Europe (w/o DE)	30	50	35	50	64
Africa	53	25	27		
America	0				
Asia	17	25	38	50	36
Stateless	0			0	0
Total	100	100	100	100	100

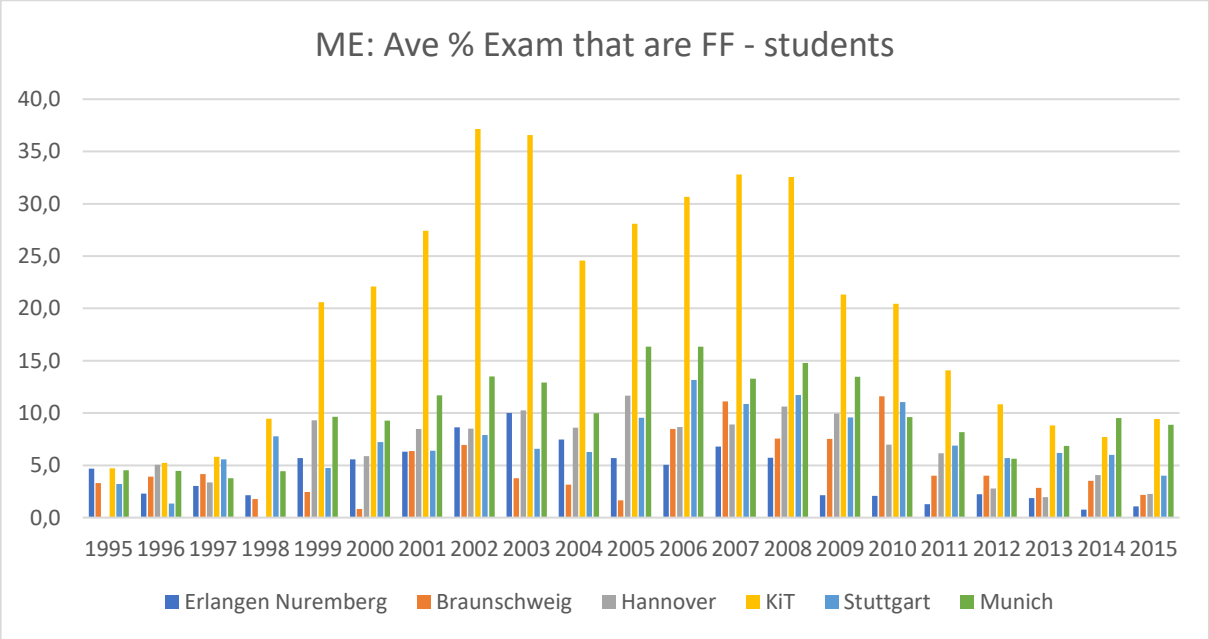
Source: FDZ – Own illustration

The table[117] shows that the greater percentage of the cohort 12 first-semester international students in Erlangen-Nuremberg's mechanical engineering are from Africa (53%), thereafter followed by the Europeans. In KiT there is an even distribution between the European, African, and Asian students. TU Darmstadt's data has more European first-semester students (50%) the rest is equally divided between Asian and African students. For TUM, with the released values, the data shows 64% Europeans in comparison to 36% Asians. The higher percentage of African international students could explain Erlangen-Nuremburg's lower success rate for the international students.

[116] Cohort 12 had a greater mic of diplom and bachelor programmes. The relation of Asian to African students will be presented later in this chapter.
[117] TU Braunschweig and Uni Hanover were excluded due to data protection.

To tie the analysis, from the individual HEI to an overall picture within the 13 cohorts and considering the different success rates according to the different regions and the different success rates of international students in the different HEIs another approach was taken. Following on from first-semester registration is the share of exams according to international/ GG-students. Graph 6.1.7.2 shows the percentage of examined students that were international – the data expanding over twenty years in each of the HEIs and compares the different HEIs. KiT consistently has an average higher percentage of examined that are international students. This could in part be related to the double degree that KiT offered.

6.1.7.2 *ME: Average percentage of exams that are FF-students in the HEIs*



Source: FDZ – Own illustration

Illustration 6.1.7.2 in conjunction with the data presented in 6.1.1.2 presents the possibility to understand the results. The higher percentage of possible double degree students could contribute to the better success rates of the international students, which then distorts some of the extremely better success rates. Nonetheless, when the data in 6.1.7.2 are reviewed, the high rate of international students' exams in KiT has a peak and drops down and evens off, meaning that the end result may distort the difference of how much the international student's success rates are better than the success rates of the GG-group, but not that the international students' success rates are better than the GG-group's rates.

6.1.8 ME: Interim Summary Mechanical Engineering

Mechanical engineering was analysed using different approaches. The perspective of the type of degree – diplom and bachelor, the retention, the aggregate of HEIs, and singular HEIs, were used to provide a comprehensive analysis of the success rates. The illustrations started with the registrations of the different student groups in diplom and bachelor, with the GG-students presented independently to the FF students because of the difference in absolute numbers. The cohorts of the synthetic variable and their respective rates in the sample of university and technical university higher education institutes showed that the success rates for international students are better than the GG-students in the sample presented. The average rates of the respective programmes were also presented. The success rates included the averages based on a group of HEIs. Using the average of the younger three cohorts, 11, 12 and 13, made it possible to measure the rates on an individual HEI level.

The varied success rates showed a preference amongst the GG-students that indicate more exams in the diplom rather than the bachelor. By using the synthetic variable to measure the success rates for mechanical engineering's GG, and FF students we could identify that the success rates for the international students are suboptimal in the bachelor programmes, but if we included the diplom in the scenario then a different picture emerges. The group of FF-students contributed to better success rates in the HEIs sample presented. The regional differences of the international students were presented, and how these regional differences in terms of the success rates and the duration of time consistently identified the lower success rates, longer duration of time and greater differences amongst the group were an attribute of the African international students. However, is this picture of positive success rates for international students a field of study type result? What happens in the electrical engineering success rates?

6.2 Electrical Engineering as a field of study:

The field of study *Electrical Engineering and Information Technology* includes a smaller number of subjects[118] as listed in chapter four.

The reason for choosing this field of study is twofold: it provides for another set of success rates from a different field within the engineering subject areas, additionally, electrical

[118] Codebook – Destatis (2015/16) and are listed in chapter four.

engineering is one of the more populated fields of study, also by the FF-students. Furthermore, it is also offered in some of the HEIs that were included in the ME analysis, therefore it adds to the comparability of the success rates and the analyses thereof. Following the electrical engineering section will be the results of the third field of study: economics.

By analysing electrical engineering, it also allows us to compare the success rates over time within the engineering fields – to look for similarities or differences in the success rates between the fields, and between the different student groups, and the study programmes. The following subchapters will present graphs similar to those in mechanical engineering, deviations from the presentations are due to data protection limitations or limitations concerning accessing the data.

6.2.1 EE.: Cohort starters

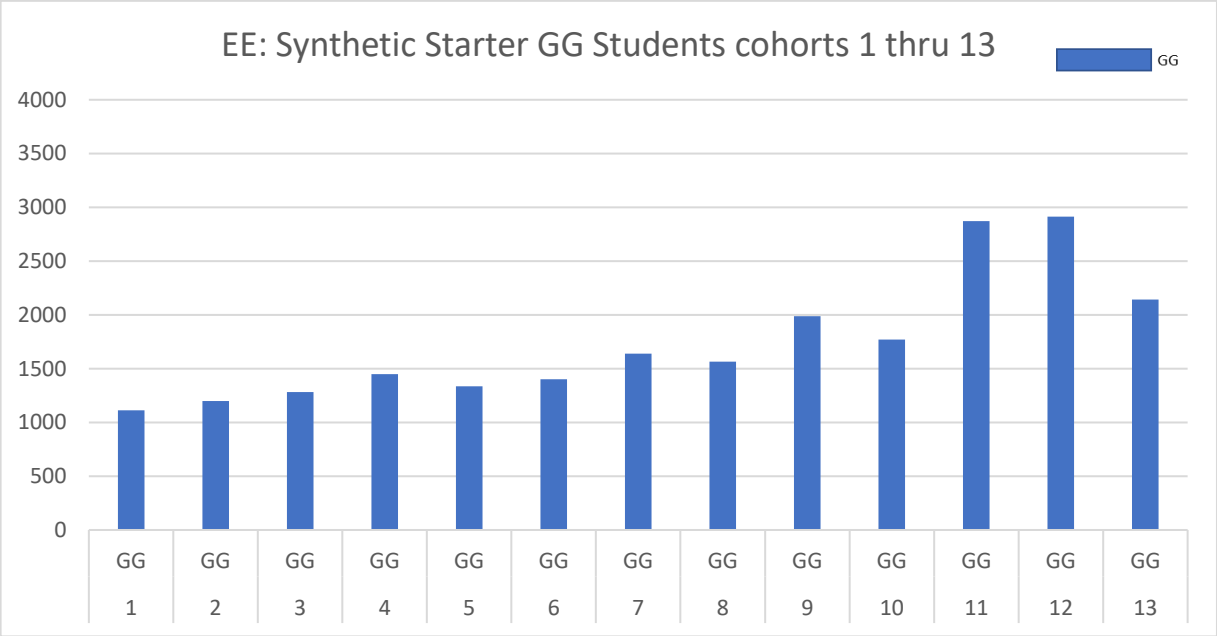
For this sample, the universities and technical universities with a six-semester bachelor programme were used, and there is an overlap with the sample for electrical engineering and the sample universities in the subsection on mechanical engineering. The HEIs are also with winter semester starters only. The sample included the TH Aachen, TU Berlin, TU Darmstadt, TU Dortmund, Erlangen-Nuremburg, Essen-Duisburg, Karlsruhe Institute for technology, TU Munich, and University of Stuttgart. The sample selection is the same criteria as that used for mechanical engineering – those universities or technical universities with the six-semester winter starter models and based on those HEIs that were included in the acatech report which accounts for up to 75% of the engineering students in Germany (Klöpping et al 2017). This also meant that the same model could be applied which also allows for a comparison of the success rates and duration of time needed in comparison to the assigned time of the programme. Unfortunately, the retention rates are not included in electrical engineering because of data access.[119]This sub-chapter focuses on the synthetic absolute starters and then the synthetic success rates.

Illustrations 6.2.1.1 and 6.2.1.2. present the first-semester absolute number of registrations in each of the 13 cohorts for both the GG-, and FF-students in electrical engineering. The graphed data show a steady increase in the numbers of the GG-students, starting with n= 1114, up until the 12th cohort, where n = 2912, thereafter there is a dip in the

[119] The initial intention was to focus only on the most populated field of study – economics but considering the relevance of engineering to the German education and economy the analyses spread to mechanical engineering. To solidify the responses, it was then decided to take a second engineering field, which was electrical engineering, however, further production of the retention rates was then hindered through the onset of the covid restrictions and then that access to the extensive data license discontinued.

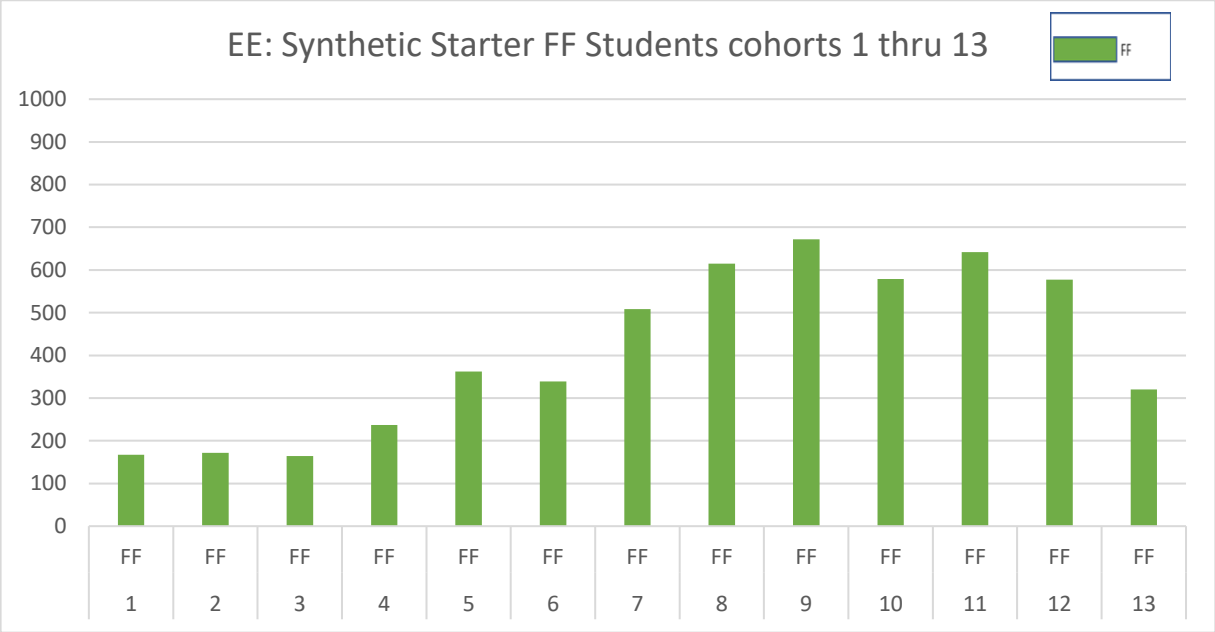
number of registrations in the 13th cohort. For the FF-students there is also an increase in the number of registrations from n= 167 in cohort one until the ninth cohort where n = 672, thereafter there is an overall decline in the first semester registrations. The declining registrations in the more recent cohorts can also be indicative of students simply choosing other HEIs, or other fields of study, and the labour market situation, or because of the challenge in achieving or being able to graduate from the degree courses. Hence, the need to analyse the success rates of electrical engineering. The GG-students peaked with n = 2912 in the sample and the FF-students peaked with n = 672 first-semester registrations with the ninth cohort.

6.2.1.1 *EE: First-semester absolute numbers of first semester GG students*



Source: FDZ – Own illustration

6.2.1.2 *EE: First-semester absolute numbers of first semester FF students*



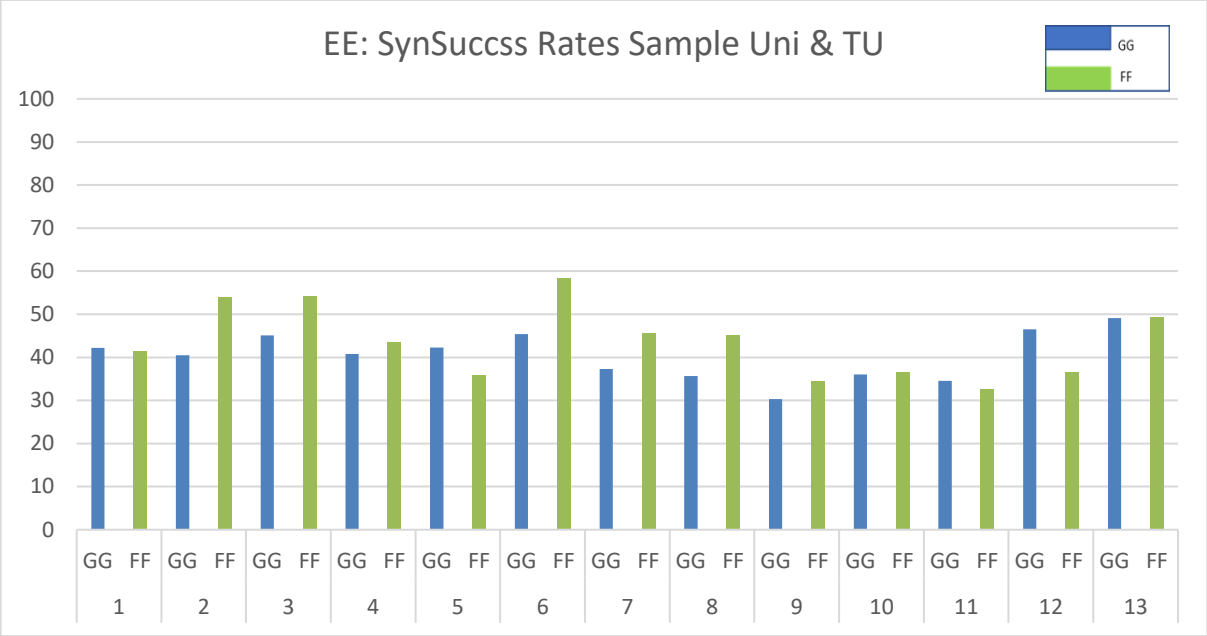
Source: FDZ – Own illustration

6.2.2 EE: Cohorts Synthetic Success Rates

The synthetic success rates for the electrical engineering field of study in the universities and technical universities are also from cohort one to cohort 13, from 1995 diplom starters and the 1997 bachelor starter until the diplom 2007/ bachelor 2009.

The absolute numbers of first registrations for the GG and FF students are in the previous two graphs. The focus in graph 6.2.2.1. are the success rates of the sample.

6.2.2.1 *EE: Synthetic success rates HEIs EE cohorts C1-C13*

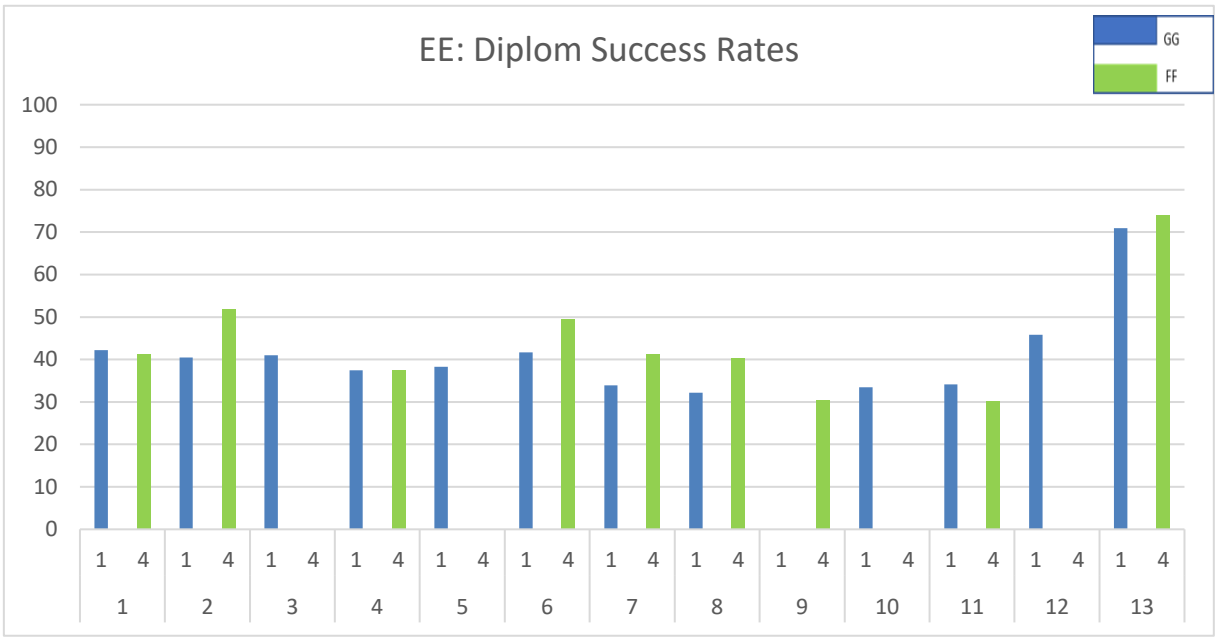


Source: FDZ – Own illustration

Graph 6.2.2.1. shows the synthetic success rates for the GG and FF students. Here, in the earlier cohorts for both GG-students in cohort one, the graph shows a success rate of 42,2% and for the FF-students they start with 41,3%. The FF-students attain their best success rate in cohort six with 58,4% as opposed to the GG-students best rate of 49,1% in cohort 13. The GG-students have a low of 30,2% and the FF-students' low is 32,7 %. The results fluctuate, – again, here in electrical engineering, we can see that the results show that the international students are not worse than the GG-students in the synthetic success rates. The overall success rate of all sample for the GG-students is M = 40,3%, the FF-students is M = 41,4%.

In mechanical engineering, both the bachelor and diplom were presented individually. For electrical engineering, both bachelor and diplom success rates will be graphed, showing the per cent of success rates in the diplom, and then in the bachelor. By comparing the success rates of the bachelor and diplom in this field, by using the sample and concentrate on the cohorts from cohort one through to cohort 13, the data is presenting an active phase of the transition to the bachelor.

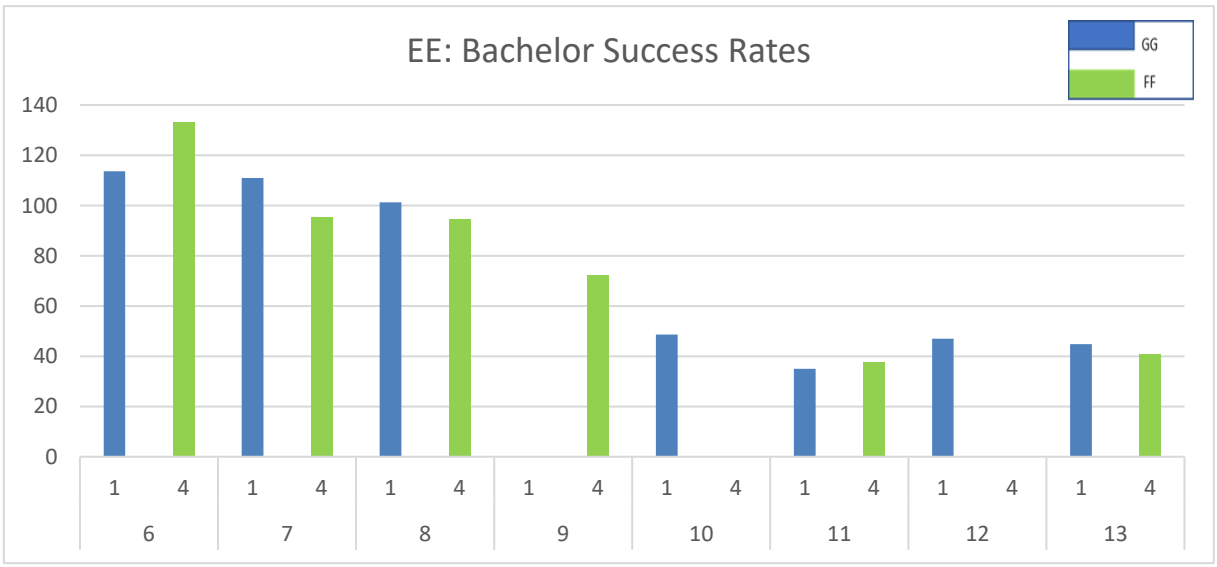
6.2.2.2 *EE: Success rates with diplom, total diplom and bachelor for GG and FF students in HEIs*



Source: FDZ – Own illustration

The graph shows (6.2.2.2.) first the diplom for the GG-students and then the FF students in each cohort.

6.2.2.3 *EE: Success rates with diplom, total diplom and bachelor for GG and FF students in HEIs*



Source: FDZ – Own illustration

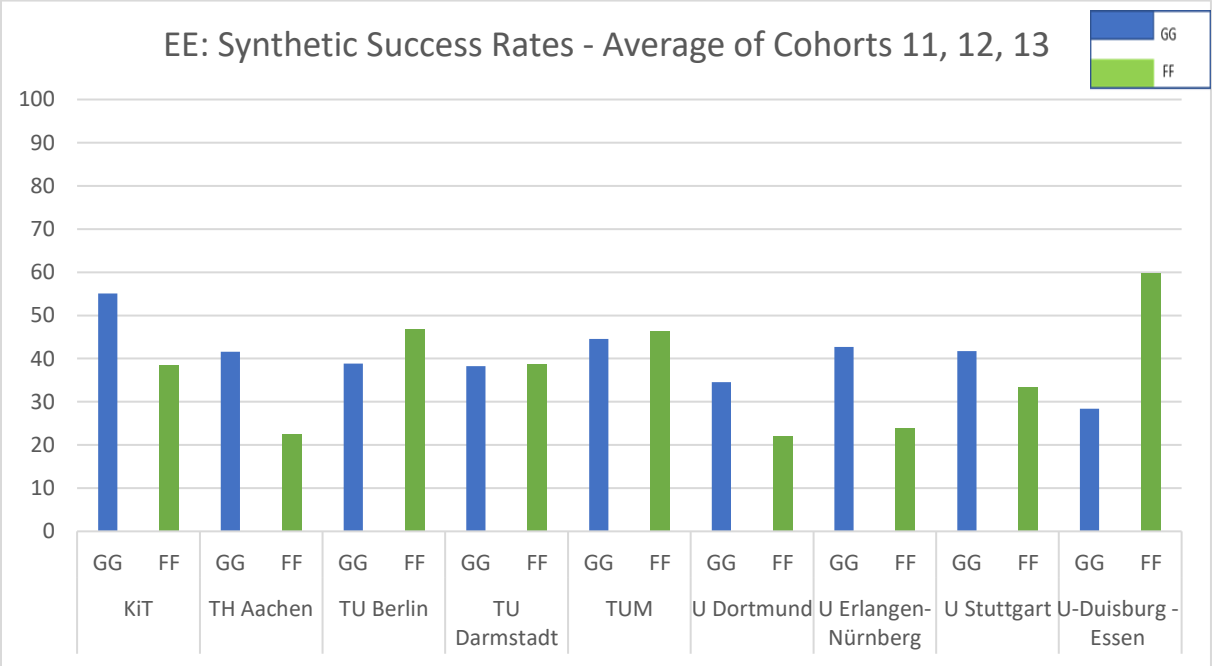
For cohort three, five, nine, 10 and 12 data are missing, because they couldn't be released. The diplom bars have comparable success rates for the GG and FF-bachelor students, in cohorts one, four, and 13. Graphed in 6.2.2.3 are the bachelor success rates, starting with

cohort six. The previous cohorts had missing data or differences which prohibited the release of the data. In the cohorts where both rates are presented, cohorts seven, eight and 13 show that the GG-students have better success rates than the success rates of the international students. In cohorts six and 11 the international students present better success rates than the success rates of the GG-students.

6.2.3 EE: Individual HEIs Success Rates

Similarly, to mechanical engineering, the following graphs the HEIs individually by using the average of the three youngest cohorts. The point is to compare the GG- and FF-students and their synthetic success rates. The graph shows that Aachen, Dortmund and Erlangen's international students success rates are between 22 and 24 %, meanwhile, the other end of the scale is with Duisburg-Essen where their FF-students' synthetic success rates are almost 60%. The GG-success rates and the FF-success rates for KiT (55,1%; 38,5%), Aachen (41,6%; 22,4%), Dortmund (34,6%; 22,0%), Erlangen (42,7%; 23,9%) and Stuttgart (41,8%; 33,3%), show how the GG-success rates exceed their FF-student colleagues (6.2.3.1).

6.2.3.1 *EE: Average Synthetic Success Rates – Three Cohorts 11,12 &13 - GG and FF students*

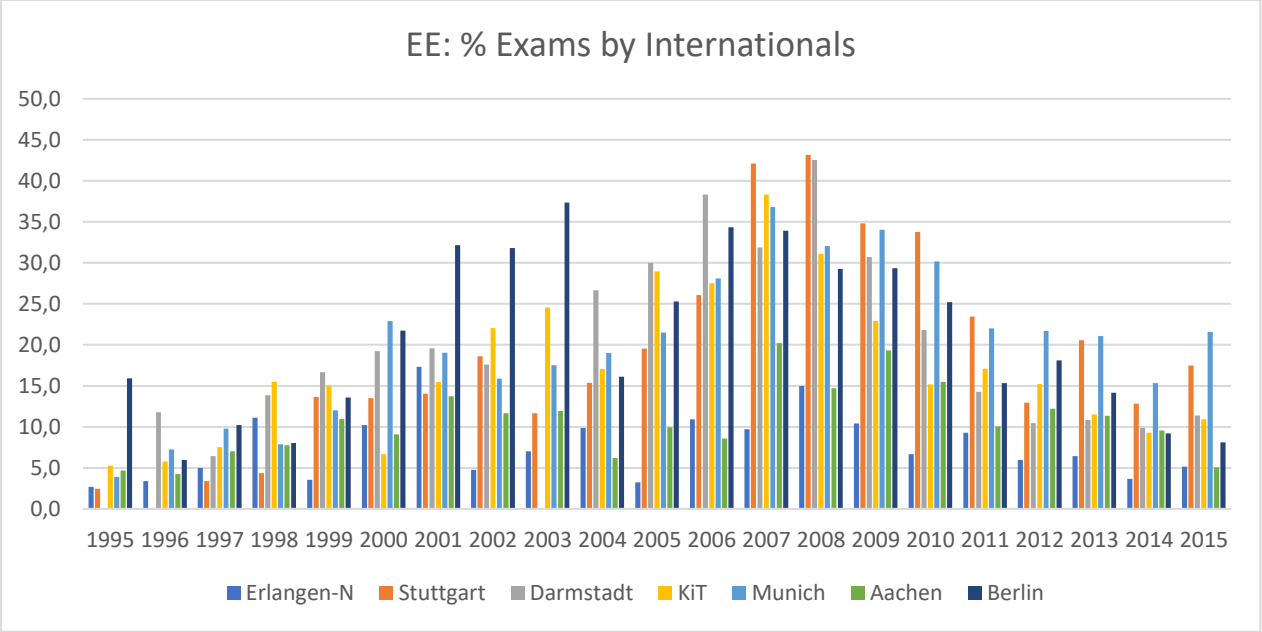


Source: FDZ – Own illustration

The gg-student success rates are significantly exceeded by the FF-students' success rates in the TU Berlin (38,8%; 46,8%) and Duisburg-Essen (28,4%; 59,8%). The difference between

the GG-students and FF-students is marginal in Darmstadt (38,2%; 38,7%) and TUM (44,6%; 46,4%).

6.2.3.2 *EE: % international students' exams on each of the HEIs*



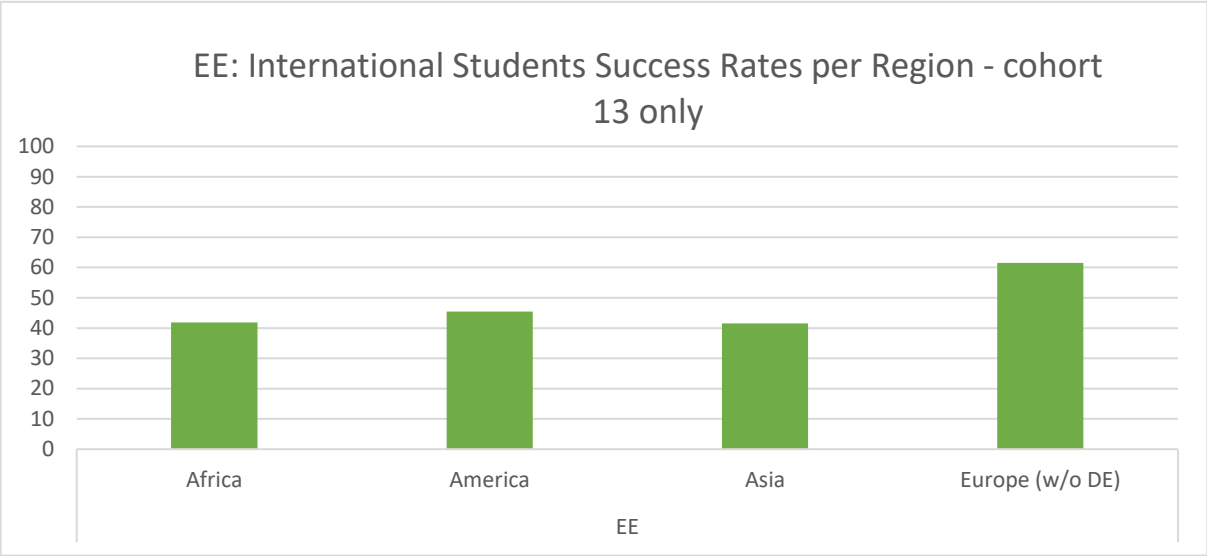
Source: FDZ – Own illustration

Graph 6.2.3.2 shows the percentage international students examined in the universities from 1995 to 2015. By going back to the previous graph that showed the HEIs individually, both TU Darmstadt and Munich had GG- and FF-student success rates that were similar. In graph 6.2.3.2. Darmstadt is consistently up to 2008 has a higher percentage of international students examined in this field of study – up to 42% in 2008, and thereafter in decline. The graph also shows a decline in the number of examined in Berlin, and Aachen has a consistent percentage of international examinations peaking 20,2% in 2007, and thereafter declining. Munich also has a consistently high per cent of the examined student body that are international, and the newer cohorts show that of the HEIs Munich is one of the HEIs that has a higher per cent success rates than the other HEIs. However, so does Stuttgart, so both the federal state of Bavaria and the federal state Baden-Wurttemberg host and have a high per cent of their international student body successfully complete their studies in this field. The graph shows an increasing and declining percentage of the examined body that are international which could also imply an increasing number and declining number of international students that embark on electrical engineering in this sample of HEIs in Germany.

6.2.4 EE: Success Rates according to Region of Origin

Graph 6.2.4.1 illustrates the international students' success rates with an aggregate according to region of origin. Here the difference between the African, American, and Asian regions is minimal, with the regions showing success rates of 41,9; 45,5 and 41,6 values respectively.

6.2.4.1 *EE: International Students' Success Rates – Cohort 13 – According to Region*



Source: FDZ – Own illustration

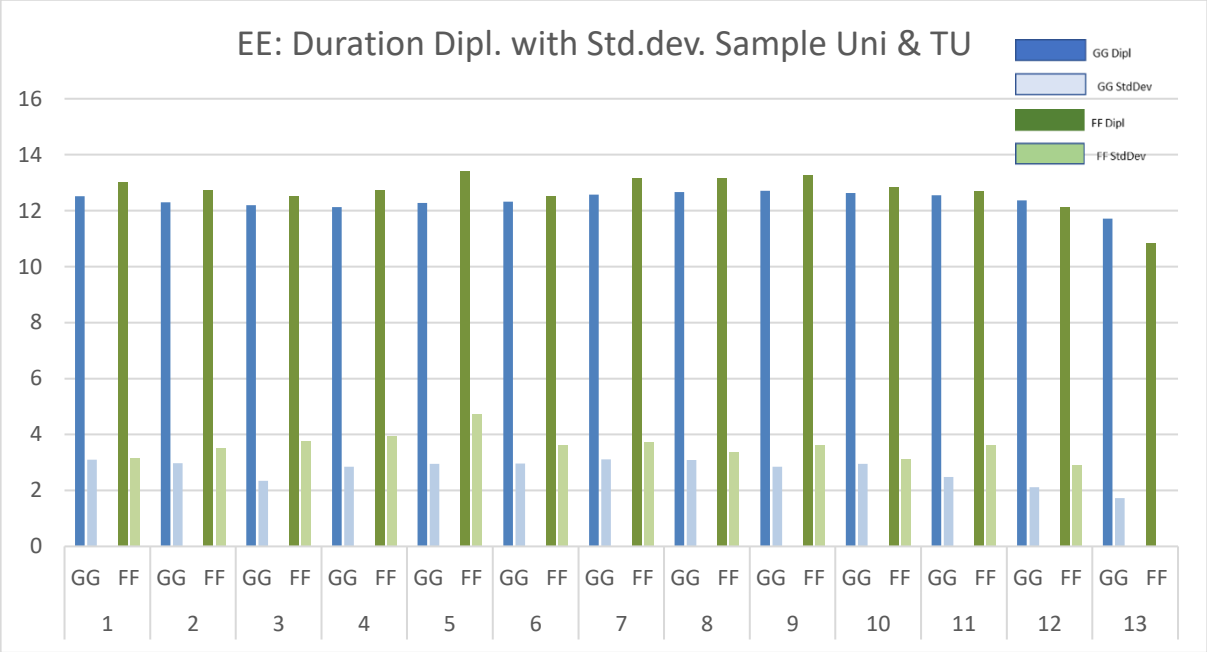
European international students' success rates show values of 61,5. From this the data tells us that the average of the regions is M = 47,6 with a standard deviation of STD = 9,4, meaning that the differences graphed between the regions using this sample is somewhat diverse. The international students' success rates according to region will be compared with the mechanical engineering students later in this chapter.

6.2.5 EE: Duration of study time

The duration of the EE-diplom (6.2.5.1) tells a similar story to that of the ME- students. In the last cohort (diplom starting 2007) the duration of time needed by the international students is less than that needed by the GG-students. The GG-students appear to have a consistent duration of time required to complete the diplom and in general, their standard deviation is the smallest. That the internationals might need longer than the GG-students are not necessarily surprising, and that their standard deviation is greater also reflects the diversity

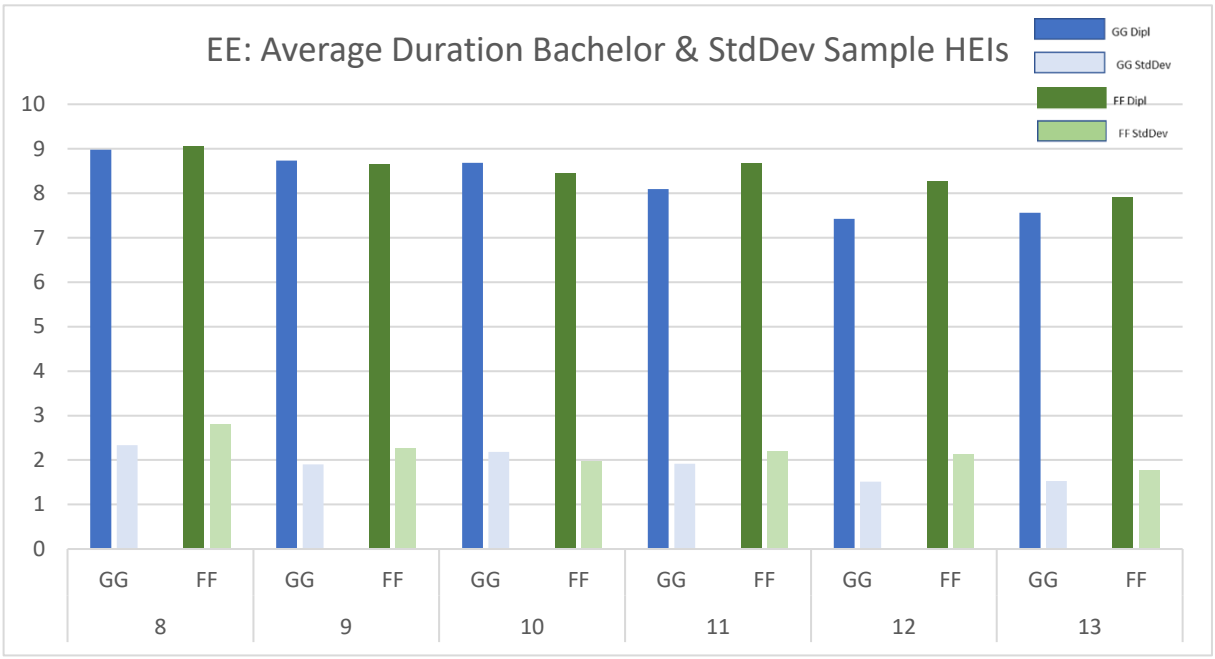
in capabilities of the international students. The semesters needed peaked in cohort five where the internationals needed an average of M = 13,4 semesters. Cohort nine, with its GG-students emerged as the cohort with the most number of average semesters needed by this group of students whereby an average of M = 12,7 semesters was needed by the GG-students.

6.2.5.1 *EE: Average Duration Diplom with StdDev in Sample HEIs*



Source: FDZ – Own illustration

6.2.5.2 *EE: Duration Bachelor in HEIs with 6 Sem Bachelor*



Source: FDZ – Own illustration

For the bachelor (6.2.5.2), for some of the cohorts, the numbers were too small, or they were too close to a previous release of data which meant that for data protection purposes they were not released. None the less the chart reflects the bachelor duration in electrical engineering GG and FF-students, showing that at the start both GG and FF students are similar in their duration, with both groups needing on average M = 9 semesters. However, with time the GG students manage to reduce their average duration closer to the regular study time, so that by the thirteenth cohort the GG-students need on average M = 7,6 semesters, as opposed to the FF-students that take on average M = 7,9 semesters for the six-semester bachelor programme. However, for both GG- and FF-students the standard deviation drops in size, and in particular with the FF-students the standard deviation drops to SD = 1,8 so that the dispersion from the mean is dropping.

6.2.6 EE: Interim summary electrical engineering

This last section included another well-frequented field of study, electrical engineering which is also popular amongst international students. The sample HEIs overlapped with those HEIs in mechanical engineering and presented the development of GG- and FF-starters in the synthetic variable, the success rates of the sample HEIs, and also the HEIs on an individual level based on the average of the three youngest cohorts. The duration of diplom and bachelor

graphed the similarities and differences between the two groups. From the success rates, the data presented the comparability of the GG- and international students success rates, with success being not consistently better or worse for the GG- or FF- student groups. The registrations in the bachelor programme are different in electrical engineering when compared to the mechanical engineering students, hence implying a difference in the type of student that comes to Germany, and also the time they are prepared to invest in achieving a particular type of qualification.

The success rates amongst the international students and in comparison, with the GG-students indicate that the international students contribute to similar success rates as those created by the GG-students.

6.3 Economics

From the previous chapters, and from the presented Destatis data Economics and Business Management[120], it is visible that as a field of study, it is the most frequented field of study in Germany. According to registrations, more students register for this field of study than any other field of study in Germany, but how do the international students fare in this field? What are their success rates? This subchapter endeavours to address exactly this issue.

6.3.1 Econ: Economics as a field of study

This field of study hosts a large number of students, and its' graduates provide labour for a global market. Due to the development of the sheer numbers of students that uptake a programme at an undergraduate level, this field's registrations show that it is increasingly attractive to both GG-students and FF-students alike. Economics as a field of study, has over ten different subjects, amongst which are international management, business administration and economics (see chapter four). The codebook also provides the different subjects which belong to particular fields of study. Hence, the codebook is provided by Destatis, and they stipulate the codes. By grouping the subjects according to the field of study we are incorporating overarching global interests regarding the world of economics and business administration. The listed courses may overlap and vary according to the HE and their particular course structure. Therefore, recoding the subjects into the field of study, as was the case for this work in both

[120] In the following, the field of study will be referred to as economics (economics and business management/ economics and business administration).

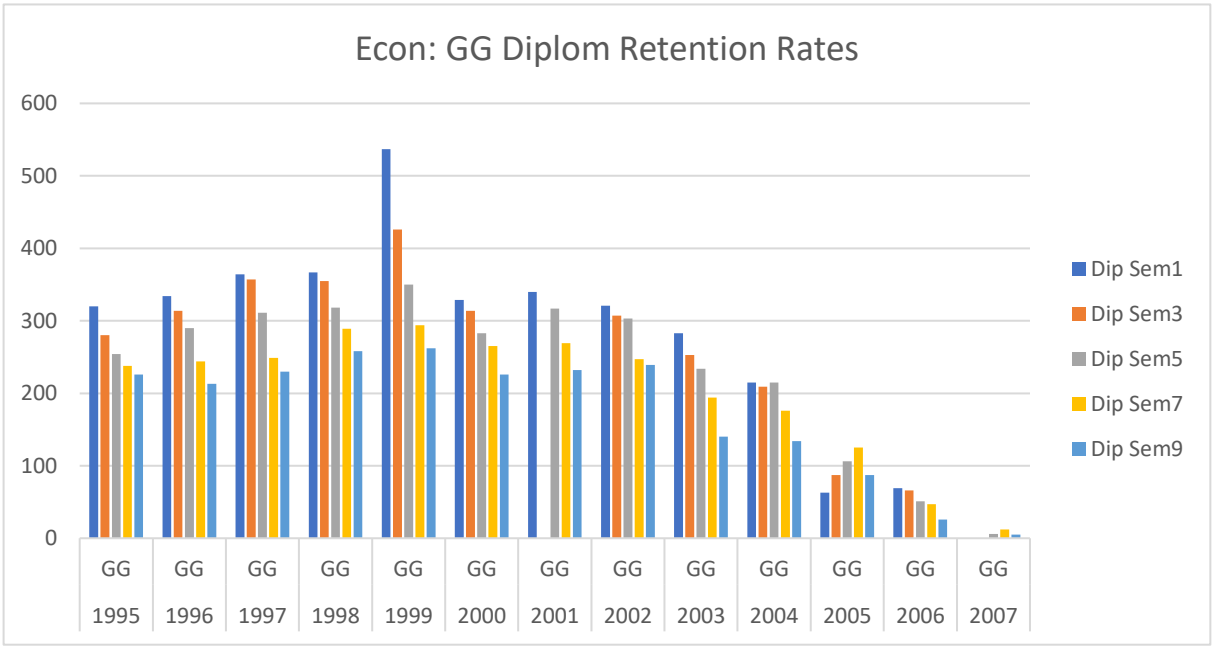
mechanical engineering and electrical engineering, is in alignment with the official statistics. By using the field of study, this work allows for movement between subjects within the one field of study, this removes subject-based dropout cases that move from one subject to the other within the one field of study.

6.3.2 Econ: Absolute number of Students per Semester in Diplom and Bachelor

In the mechanical engineering field of study, the graphed data included all the HEIs to show the progression of the numbers of students from the first to the third semester. In electrical engineering, data restrictions prohibited this access. For this field of study, the retention from the first to the third semester will be shown using one university. The reason for presenting the data in the same format but limiting it to this one sample is to present a case study – this university: the University of Munich will also be used later in this subchapter to present the success rates of two HEIs but within the one city. Using one university presents an overview of the actual numbers of students in a large university that hosts many (international) students (see chapt. 5.4). Graphed first are the retention rates in diplom and bachelor for the GG-students, and the FF-students respectively. The purpose of the individual HEI is to show what can happen at the individual level. The numbers are quite small but also reflect the retention rates at a microscopic level.

In graph 0 the data presents first, third, fifth, seventh and ninth semesters, with the starting group in the winter of 1995 and the last group of starters in 2007. Each year shows the registrations for that year and its first semester student registrations, then the third semester registrations counting from what would have been the first year, and the fifth semester registrations counting from what should have been the first semester, etc.

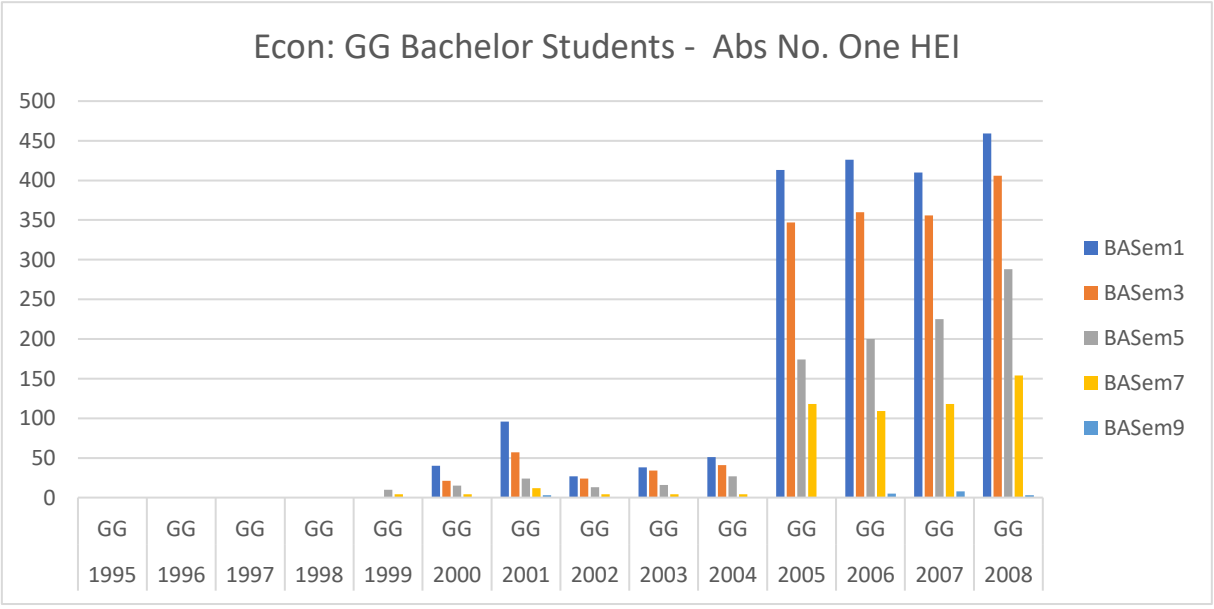
6.3.2.1 Econ: Graph of GG Diplom in One Uni – absolute numbers



Source: FDZ – Own illustration

Graph 6.3.2.1. shows a picture of increasing registrations in the first semester of the diplom up until 1999, whereby there were n = 537 GG-students registered in the first semester. Thereafter there was a decrease. The number of students that were accounted for in the ninth semester remained steady, beginning with n = 226, and in the eighth cohort, there were n = 239 in the ninth semester. Thereafter the number of students in more senior cohorts dropped.

6.3.2.2 *Econ: Graph of GG Students Bachelor in one Uni – absolute numbers*

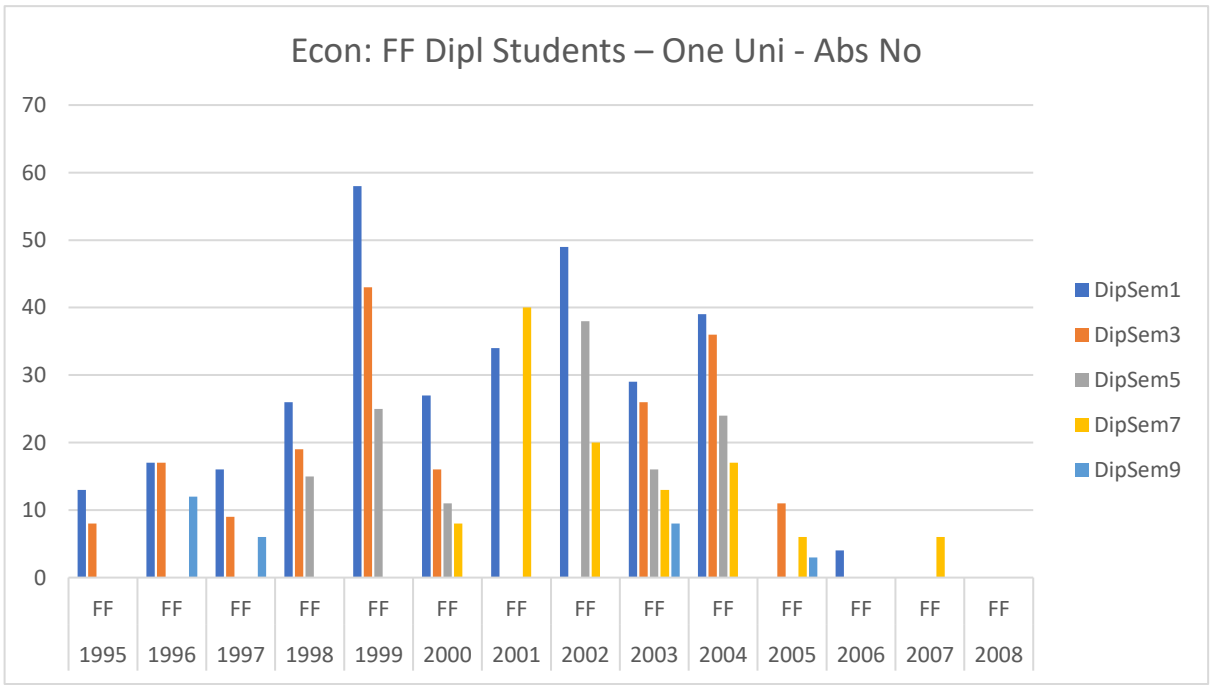


Source: FDZ – Own illustration

The GG-students bachelor absolute numbers are presented in 6.3.2.2. The pattern has staggered starts but identifiable differences between the third and fifth semester from 2005 – 2008, whereby for the retention rates of the HEI for the registration of starters in 2005, there are n = 347 students in their third semester, and in the fifth semester there are n = 174 students. Placed beside the graph about the diplom the question is – are the bachelor students moving to the diplom? It would explain the large drop. It could also be the result of moving into the programme and the university – and switching could explain the discrepancy. This can be followed through in the cohorts and their success rates. But how do the FF-students deal with the option of a diplom or a bachelor programme?

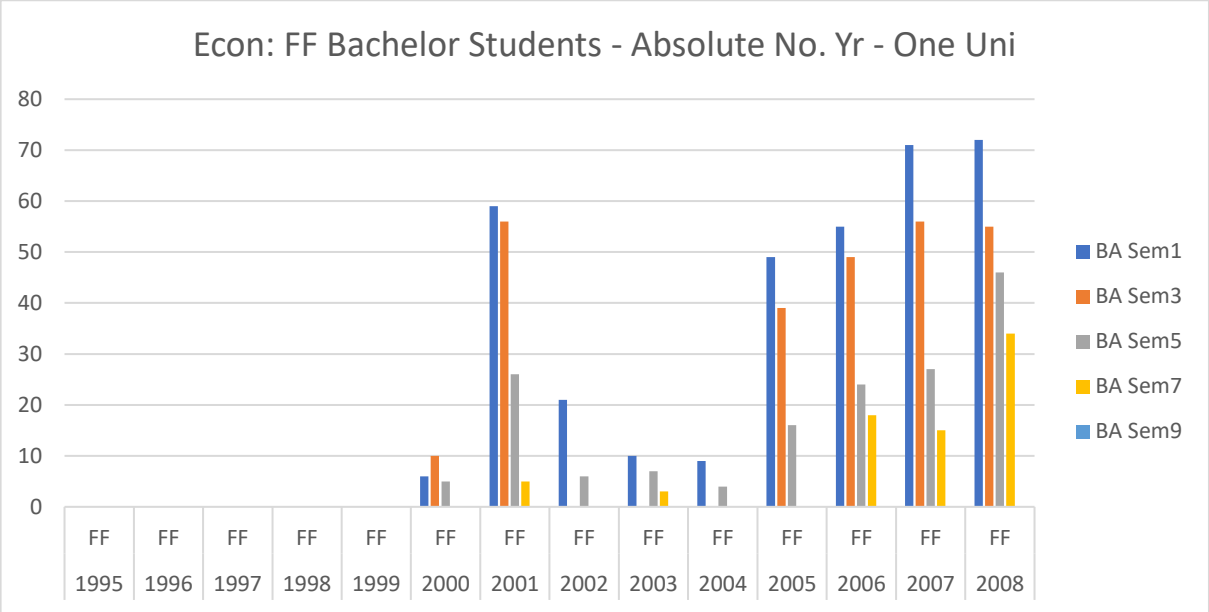
Graph 6.3.2.3 presents the FF-diplom students, and by focusing on one larger university the graph shows the absolute presence of the international students in this field and how time sees the drop in first registrations in the diplom programme. Does this coincide with a rise in the bachelor first semester registrations?

6.3.2.3 *Econ: Graph of FF Students Diplom in one Uni – absolute numbers*



Source: FDZ – Own illustration

6.3.2.4 *Econ: Graph of FF Students Bachelor in one Uni – absolute numbers*



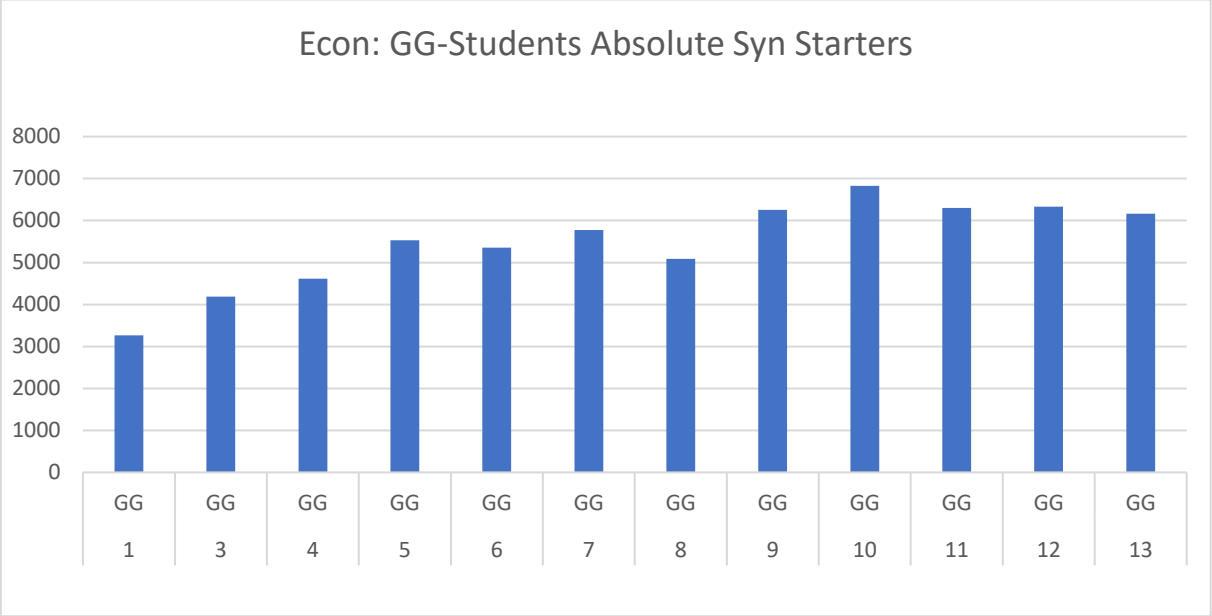
Source: FDZ – Own illustration

The FF- diplom students in economics show an unsettled picture with no real identifiable trend. In 2003 a possible pattern begins to develop but does not hold beyond two periods (starter group 2003 and starter group 2004). However, this would appear to balance in the bachelor programme (6.3.2.4). There is an identifiable pattern from 2005 for the FF-students which seems to settle with the last shown group starting in 2008. This is another argument for using the synthetic variable, as it allows access to the cases and presents the overall success of the HEIs. Identifying the interest in bachelor and diplom programmes for the international students could imply the interest that international students had in the diplom, and that their coming to study in Germany was also because of the diplom and not just because of the bachelor.

6.3.3 Econ.: Cohorts Starters in Sample HEIs.

The following two graphs show the growing numbers of first semester registrations in HEIs with a six-semester bachelor programme, the point being to see the amount of GG- and FF-students in this group of HEIs. This sample of HEIs in 6.3.3.1 is based on HEIs' winter starters only HEIs.

6.3.3.1 *Econ: Synthetic Diplom and Bachelor – German students – First Semester*



S ource: FDZ – Own illustration

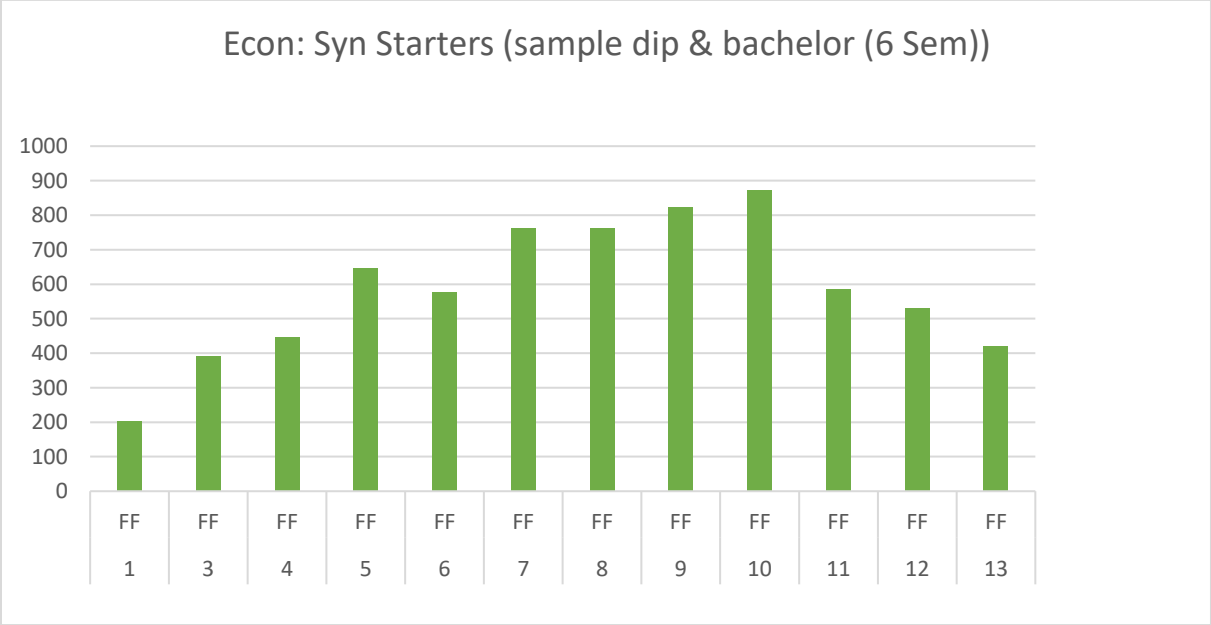
The programmes with six semesters most frequented in this field of study included the University of Essen, University of Paderborn, Europa-University Frankfurt od., Humboldt University, University of Magdeburg, University of Trier, University of Freiburg, University Erlangen-Nürnberg, University of Munich, University of Augsburg, FU Berlin. [122] Graph 6.3.3.1 presents the aggregated first semester registrations, and later success rates. The numbers of GG- students are presented first.

The point of presenting the GG and FF-students is due to the difference in absolute GG-numbers and FF-numbers. The general trend for GG-students is an increasing number of students – with starters of n = 3262 in cohort one in the chart to n = 6165 in cohort 13, whereby there is a peak with n = 6828 in cohort 10.

Graph 6.3.3.2. shows the synthetic starters of the FF-students. Cohort one has n = 203 registered FF-students, and this number increases and peaks in cohort 10 with n = 872 students and drops to n = 421 in cohort 13. This is relevant for these HEIs, and it may be a reflection of the growth in offers, such as with the internationalisation of programmes which is encouraged by EHEA and also with that the increase of programmes offered through English by other HEIs.

[122] Unfortunately, this excluded universities with also summer starters such as the Cologne.

6.3.3.2 *Econ: Synthetic Diplom and Bachelor –FF Students– First Semester*



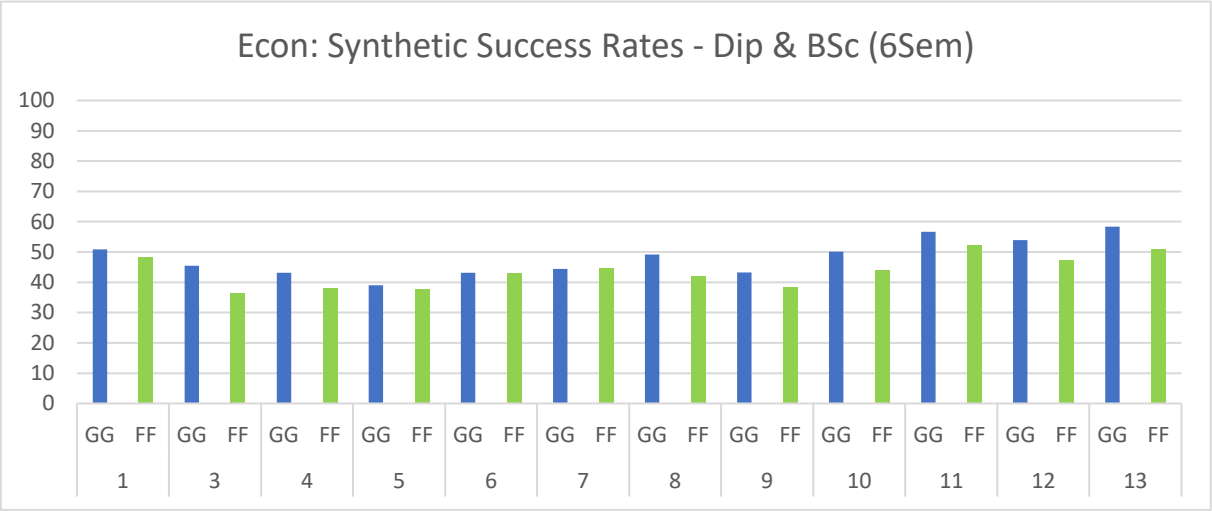
Source: FDZ – Own illustration

6.3.4 Econ: Cohorts Synthetic Success Rates

Economic is an immensely popular field of study – with a broad spectrum of possible employment opportunities. The success rates in illustration 6.3.4.1. show the GG-students, and FF-students in cohorts one to thirteen[123]. The illustration is based on the synthetic success rates, and those having completed their programme within the total expanded time of up to 10-semesters for the bachelor or up to 14 semesters for the diplom. These average success rates vary over time but do not exceed 60%.

[123] Cohort two was excluded as it could not be released.

6.3.4.1 *Econ: Synthetic Diplom and Bachelor – Cohort 1-13 synthetic success rates*



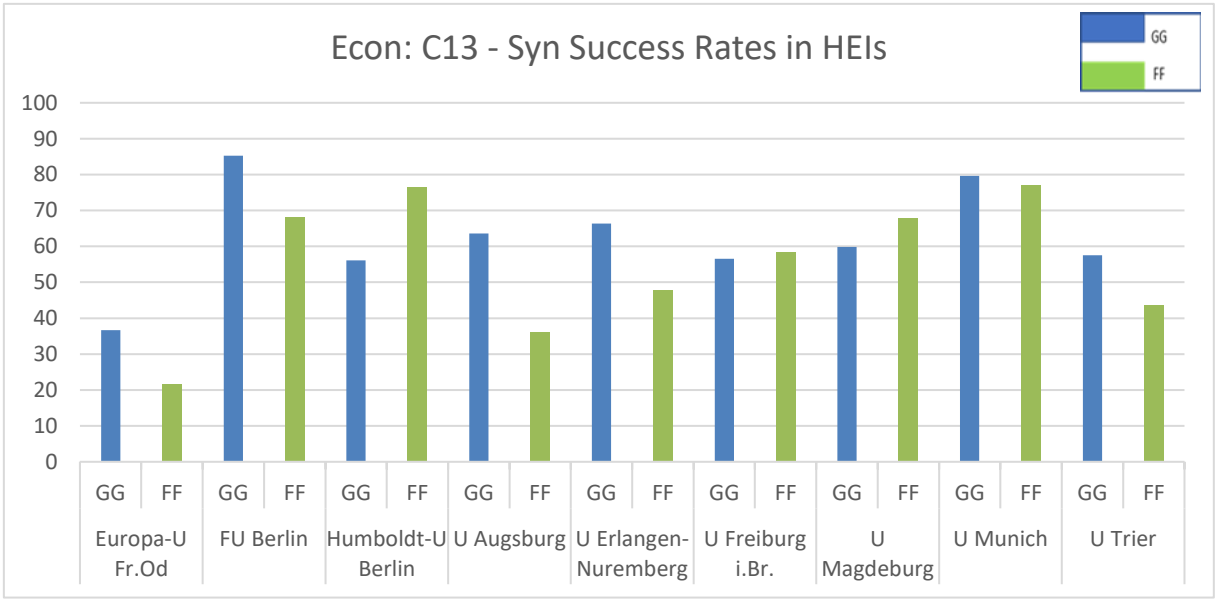
Source: FDZ– Own illustration

The results show that the synthetic rates for the GG-students are consistently better than the FF-students' success rates, and the overall success rate when including all cohorts' results in an M = 55,6 % for the GG-students' success rates and M = 43,3% for the FF-students' success rates. These results are based on the sample using all the HEIs listed. To take a closer look the following (6.3.5) illustration (6.3.5.1) identifies different HEIs in the sample, showing nine HEIs in the GG-and FF-student groups for just one cohort.

6.3.5 Econ.: Individual HEIs Success Rates

This section identifies the success rates of one individual cohort and that of the three cohorts as in mechanical engineering and electrical engineering. Adding the individual cohort was possible because of the larger numbers of students in economics. In graph 6.3.5.1 the youngest cohort was selected - cohort 13 and was used to identify the situation for one cohort with the individual HEIs. Presenting singular cohorts serves two purposes: it presents what snapshot results can look like and reinforces the importance of temporal analysis with a minimum of three cohorts to attain reliability. In this particular cohort, the work presents results that reflect both the high success rates of some HEIs and the low success rates of other HEIs, for example, the University of Munich produces similar success rates for the GG (79,6%) and FF (77,0%) - students' groups. Humboldt's success rates can also be attributed to the positive contribution made by international students (GG 56,1%; FF 76,5%).

6.3.5.1 *Econ: Synthetic success rates in one Cohort for the different HEIs*



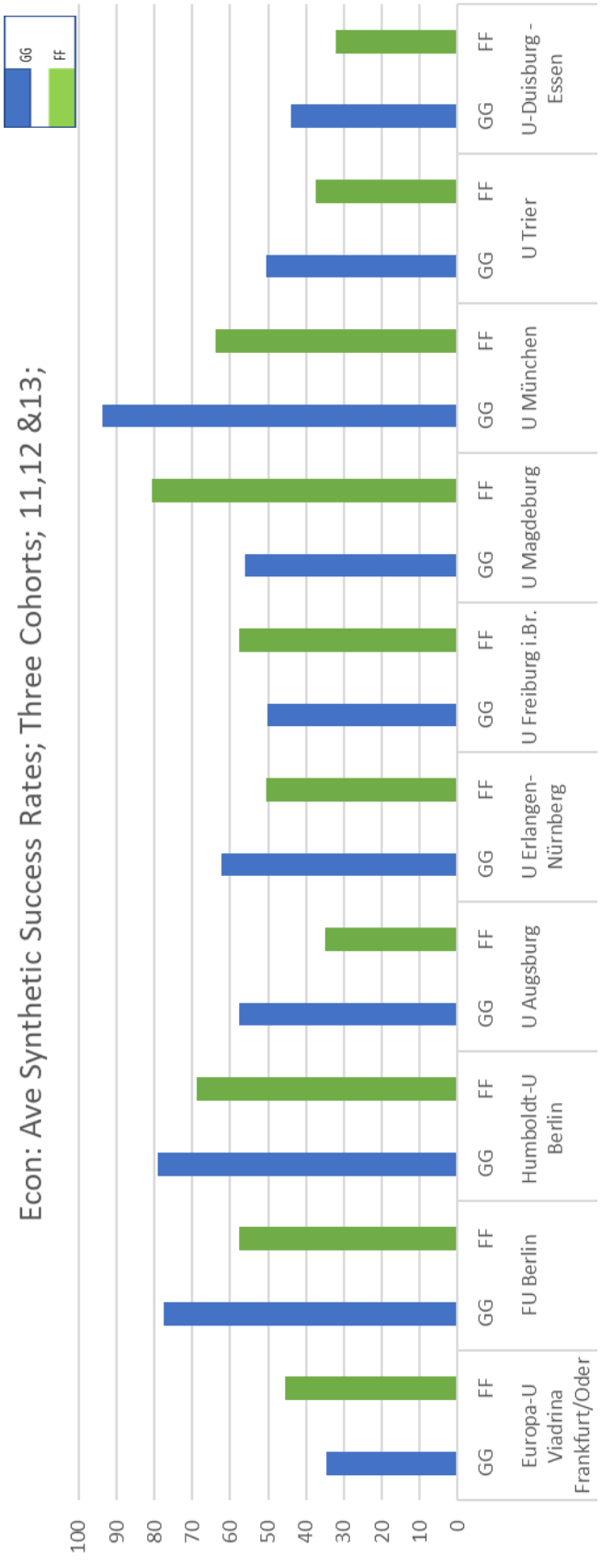
Source: FDZ – Own illustration

However, one cohort gives a snapshot, so in order to graph the differences between the HEIs, using the average success rates for cohorts 11, 12 and 13 are presented in the next graph. This allows for a comparison of the three youngest cohorts used to create a sample, which was also the method used in mechanical and electrical engineering.

The results in the graph (6.3.5.2) show that the University of Munich's GG- students produce the better success rates (GG 93,8%; FF 63,8%), whereby Magdeburg tops for the international students' success rates (GG 56,2%; FF 80,8%), shortly behind come Humboldt (GG 79,3%; FF 68,9%). The point of the graph is to show that the data can be used to measure at an individual level, albeit difficult and not always accessible due to small numbers.

6.3.5.2 *Econ: Synthetic success rates in three Cohorts 11, 12 & 13 - for the different HEIs*

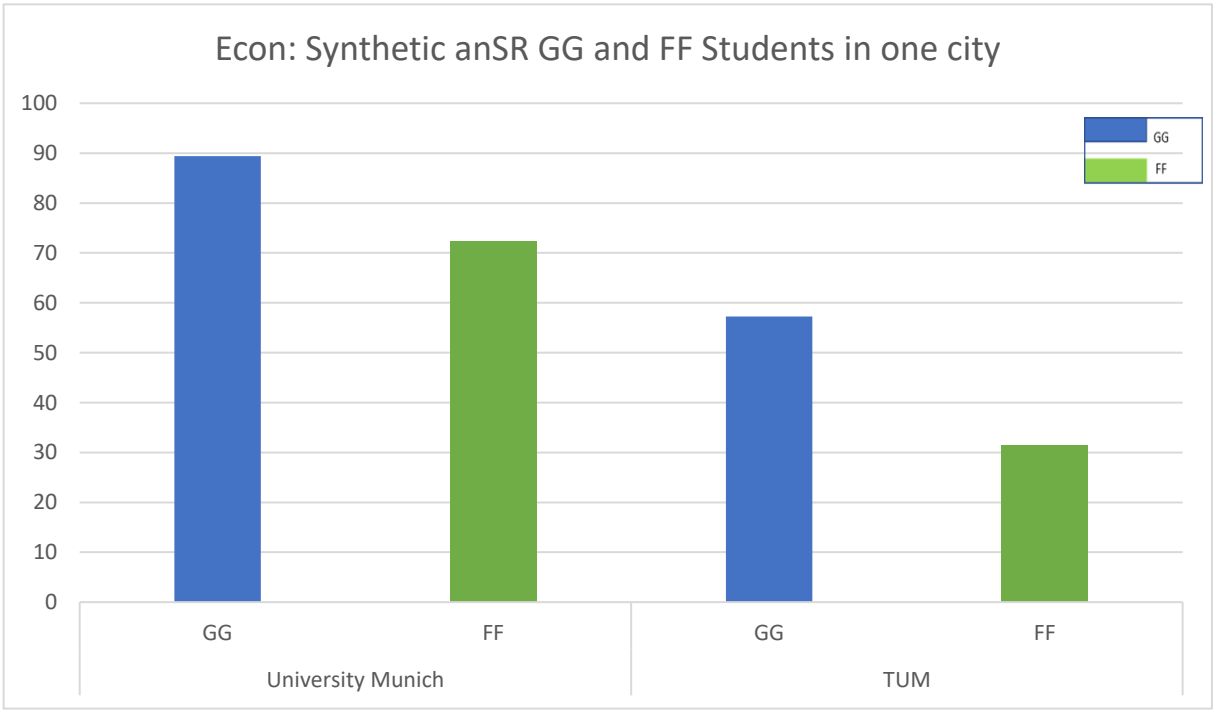
Source: FDZ – Own illustration



6.3.6 Econ.: Digression – Synthetic SR – two HEIs in one City.

The previous illustrations graphed cohort 13 with each HEI, and the HEIs were also graphed with the average synthetic rate of cohort 11, 12 and 13. The following (6.3.6.1) graphs cohort 12 with – Ludwig-Maximilian's University of Munich and Technical University Munich [124]. Both universities are within walking distance of each other. The graph presents the GG and FF-students with their respective synthetic success rates. The point of the graph is to see differences and similarities within one popular urbanity, with two institutions in close proximity of each other and how different results are produced, allowing for incorporation of literature with socio-geographical analysis (McWilliams 2018). In addition, by using Munich, there is the ability to compare the success rates in this field of study with mechanical engineering and electrical engineering.

6.3.6.1 *Econ: Synthetic SR and Bachelor SR – Cohort 12 in two HEIs*



Source: FDZ – Own illustration

These results reflect the classical picture of the GG-students contributing to the HEI's better success rates than the international students. The results of the success rates in two HEIs – Ludwig-Maximilian's University Munich (LMU) and Technical University Munich (TUM)–

[124] University Munich and TUM; values "1" the other value is "2) A different cohort is used because of data protection laws.

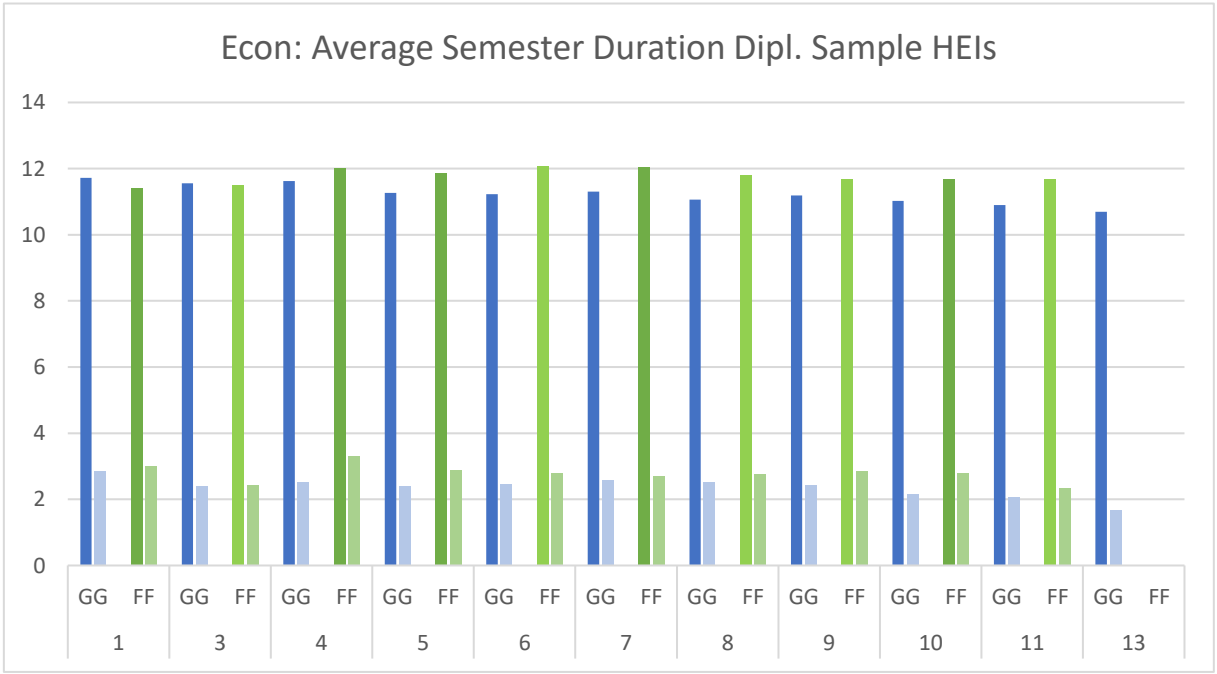
with the synthetic variable showing 89% for the GG-students in UM and 57% for the GG-students in TUM. The synthetic success rates for their international students are 72% in UM and dropping to as low as 31% in TUM.

Therefore, the work shows that on an individual level, there are results – such as almost 90% of the GG-students in one cohort managed to complete their respective diplom/bachelor within the given time. For the International students, their success rates are not as good as the GG-students, but the FF-students' success rates of 72% are still quite good.

6.3.7 Econ.: Duration of time

The synthetic variable includes two different programmes with different durations of time required. The different programmes with their different durations have the potential to attract different types of students. There is a large difference between a programme that is supposed to be 10-semesters and one that is supposed to be six-semesters. The longer a student needs to study, the longer the student is absent from the labour market, and also possibly the more the student or its support network has to support the student to get them through their studies.

6.3.7.1 *Econ: Duration of time needed to complete Diplom – all exams*

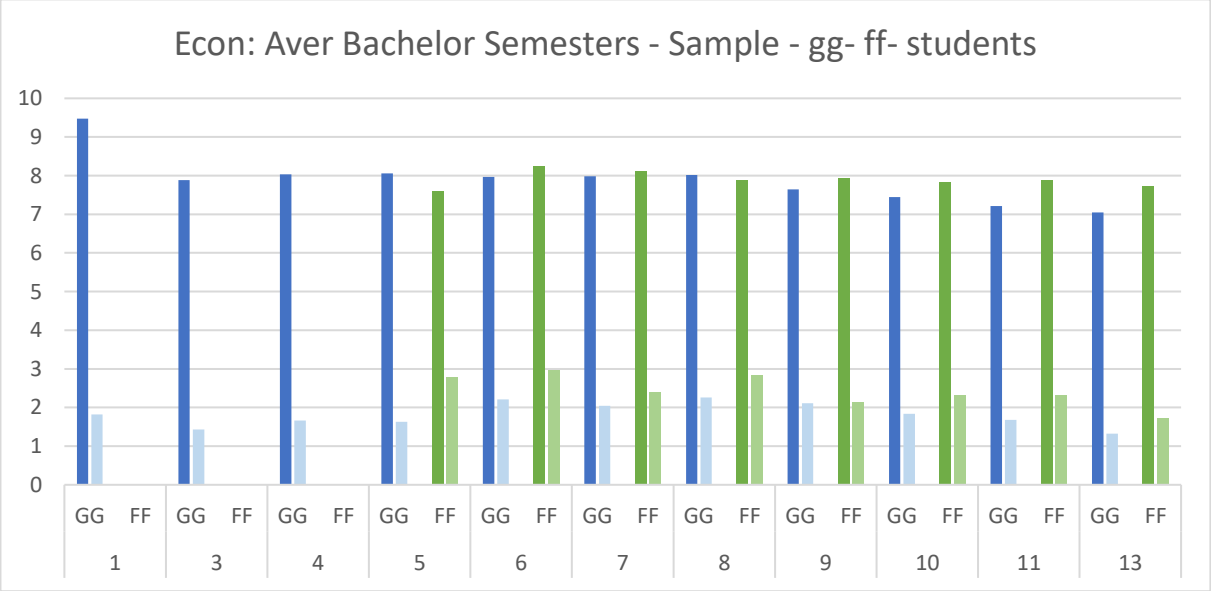


Source: FDZ – Own illustration

The average duration and the standard deviation of the diplom in the given HEIs are illustrated in 6.3.7.1. This illustration shows quite clearly that the FF-students need longer than the GG-students, and that the standard deviation consistently decreases for the GG-students from SD = 2,8 to SD = 1,7 semesters. For the FF-students the standard deviation also drops but from SD = 3,0 to SD = 2,3. The average duration of the diplom is M = 10,7 in the thirteenth cohort, that is also a drop from the average of M = 11,7 semesters in the first cohort in the graph. For the FF-students there is no drop in the average duration from the first to the last graphed cohort.

The bachelor is illustrated in 6.3.7.2 and the story is quite similar from the sixth cohort.

6.3.7.2 *Econ: Average Duration of time needed to complete Bachelor -Sample HEIs*



Source: FDZ – Own illustration

For example, in the thirteenth cohort, where the GG-students need, on average, seven semesters to complete their Bachelor, the FF-students need M = 7,7 semesters. Between both the GG- and FF- students there is quite a difference in the standard deviations – and these values drop for the GG-students from SD = 2,2 to SD = 1,3 semesters implying less differences in the time needed to complete the programme amongst this group of students.

6.3.8 Econ.: Interim Summary economics

The data presented the varied success rates between different HEIs in more than one cohort and the average synthetic success rates within this field of study using twenty years of data. The results of the group of HEIs show that on average the GG-students fare better than

the FF-students. From the group of nine HEIs that were presented, only one of them presented roughly equal success rates for both groups.

In the rates of retention from the first to the third semester, this field of study is quite unsettled or even erratic, the data presented restricts proofing preference, but there seems to be no clear preference shown by the FF-students for diplom or bachelor.

The duration of time was presented, as were the average synthetic success rates of the individual HEIs using three cohorts. Further analysis with two HEIs in one urbanity allows for a comparison with other fields of study within the one city.

6.4 Interim summary individual fields of study

This chapter presented the data based in the form of cross-cohort analyses using a synthetic variable that merged the diplom and bachelor students, using a common endpoint to create the cohort. The data were presented for individual degrees and the synthetic variable with the combined results of the bachelor and diplom in mechanical engineering, electrical engineering and economics and business management. Using the registrations in the student data provided for a model of retention/ continuation rates that contribute to understanding the students' position in the HEIs.

The three fields of study were looked at individually, showing the success rates of GG, and FF students. Furthermore, the duration of the bachelor and diplom programmes were included where the data was released, and the calculations were possible[125]. The next part of the chapter will seek to look at the group of students known as the Bildungsinländer – German higher education qualification and a foreign citizenship. Thereafter the three fields will be further analysed.

6.5 Foreign Students with German Higher Education Qualification

This work's focus is the comparative analysis of the success rates between the German students and the international students. A by-product of the results produced the success rates of those students that have a German secondary school qualification and a non-German citizenship, they are described as Bildungsinländer (Kercher 2018, McGrory 2020). This subchapter introduces their success rates into the picture. The reason for including them in the

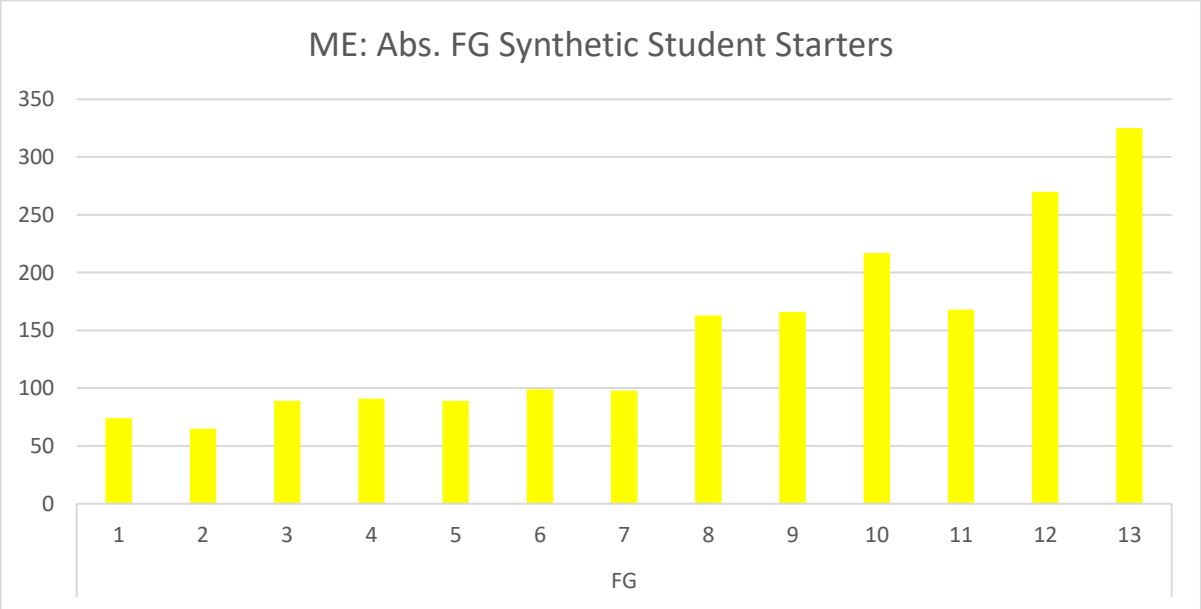
[125] Like any research, it involved a great deal of trial and error. It must be stated that the methods applied involved a great deal of time, not alone in their construction, but in the consequences of having data released, and the implications of particular models, and the data protection laws. Ultimately, the route chosen was one that presented the fairest approach to understanding the HEIs experience

results is that they contribute to understanding the results in the literature, as they are foreign/international and not German, and in the Destatis webpages Destatis (2019) present results for German and foreign/international students as one group. The following paragraphs address this group in university and technical university's bachelor and diplom degrees and in two fields of study: mechanical engineering and economics, electrical engineering is excluded as the data could not be released.

6.5.1 ME: FG Synthetic Variable, Six Semester Bachelor

The following two graphs (6.5.1.1 and 6.5.1.2) present the FG-students' absolute numbers in the starting semester of their different cohorts. Using the same sample universities as in 6.1 for the mechanical engineering students in the universities and technical universities, the data graphs their development.

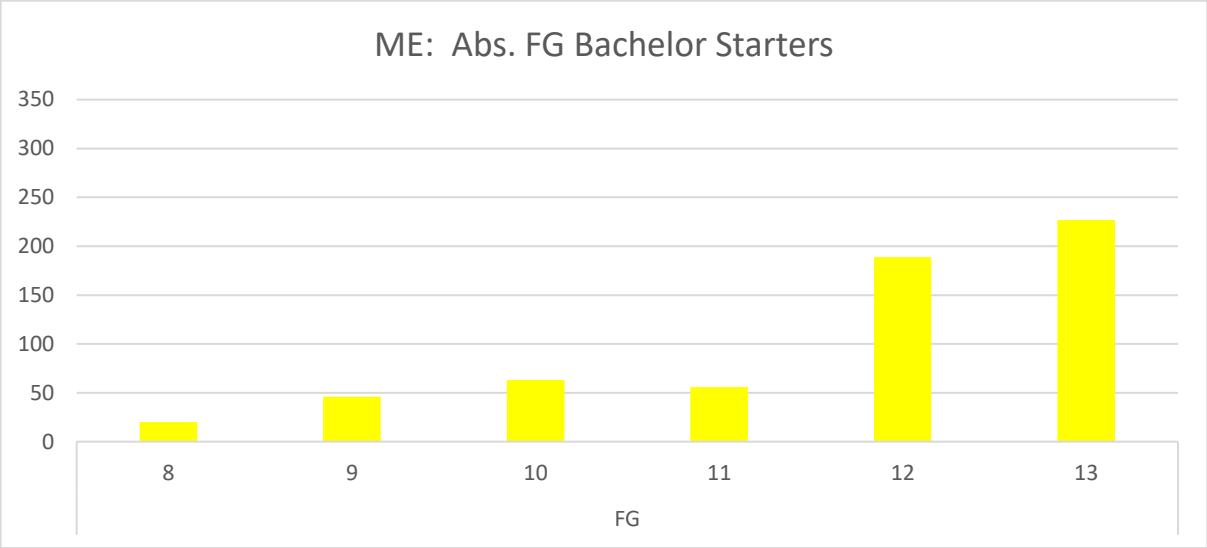
6.5.1.1 *ME: FG students first-semester registration – synthetic variable*



Source: FDZ – Own illustration

The absolute numbers of the synthetic starters rise from just over 50 in cohort one to n = 325 in cohort 13. The second of the two graphs show how the FG-students' in mechanical engineering registrations develop: the bachelor starters' rise from n = 20 in cohort eight to n = 227 in cohort 13, previous cohorts showed no bachelor starter registrations.

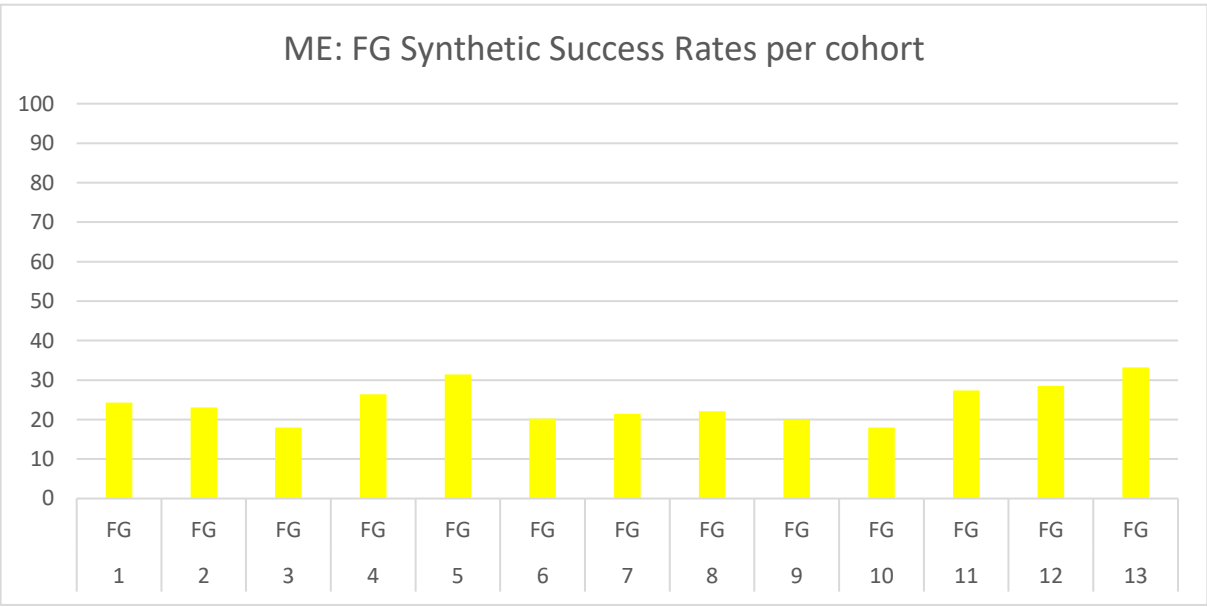
6.5.1.2 *ME: FG students first-semester bachelor registration*



Source: FDZ – Own illustration

The synthetic success rates for this group of students are graphed in 6.5.1.3 Starting in cohort one with a synthetic success rate of 24,3% and culminating in cohort 13 with a synthetic success rate of 33,2%, the overall success rates did not surpass 35%. In all of the cohorts, the FG-students remain in with comparatively lower success rates to those of their German and international students with their lower success rates where the FG-students emerge with an

6.5.1.3 *ME: FG students synthetic success rates*

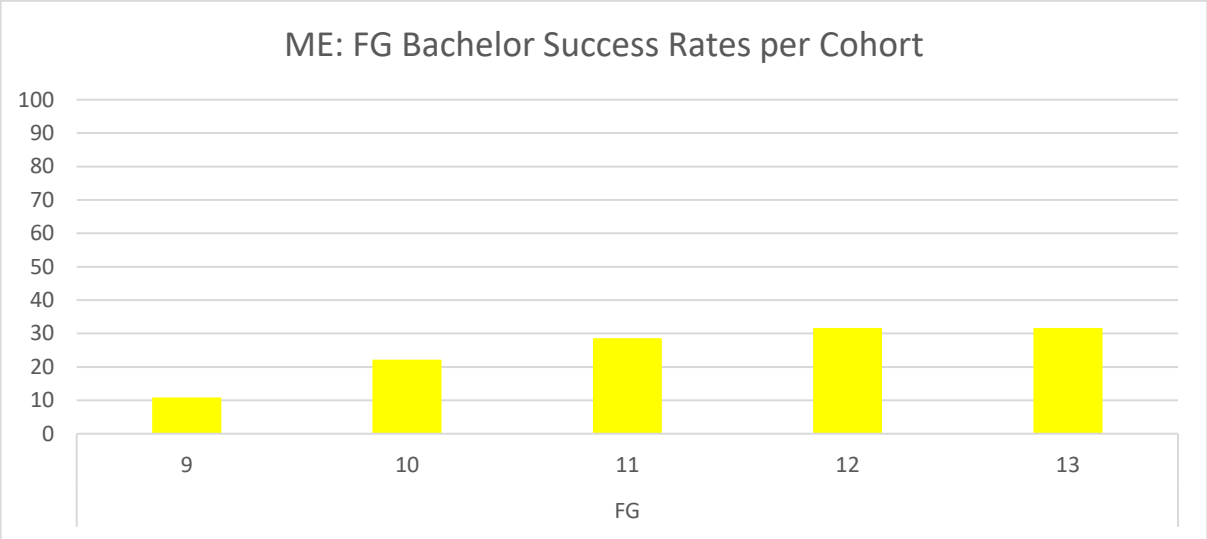


Source: FDZ – Own illustration

averaged success rate of M = 24,1% in the synthetic variable (with the GG-group success rate average of M =41,5%, FF-group success rate average of M = 59,7%). Comparatively speaking, the GG-total average success rate was M = 41,1%, the FF-students had a total average of M =

54,5% and the total FG success rate was M = 25,1 %. The next graph (6.5.1.4) shows the success rates in the bachelor. From cohort nine, with a success rate of 10,9% to cohort 13 with a success rate in the bachelor of 31,7% the graph shows a steady increase over the course of the presented cohorts.

6.5.1.4 *ME: FG students success rates – bachelor*



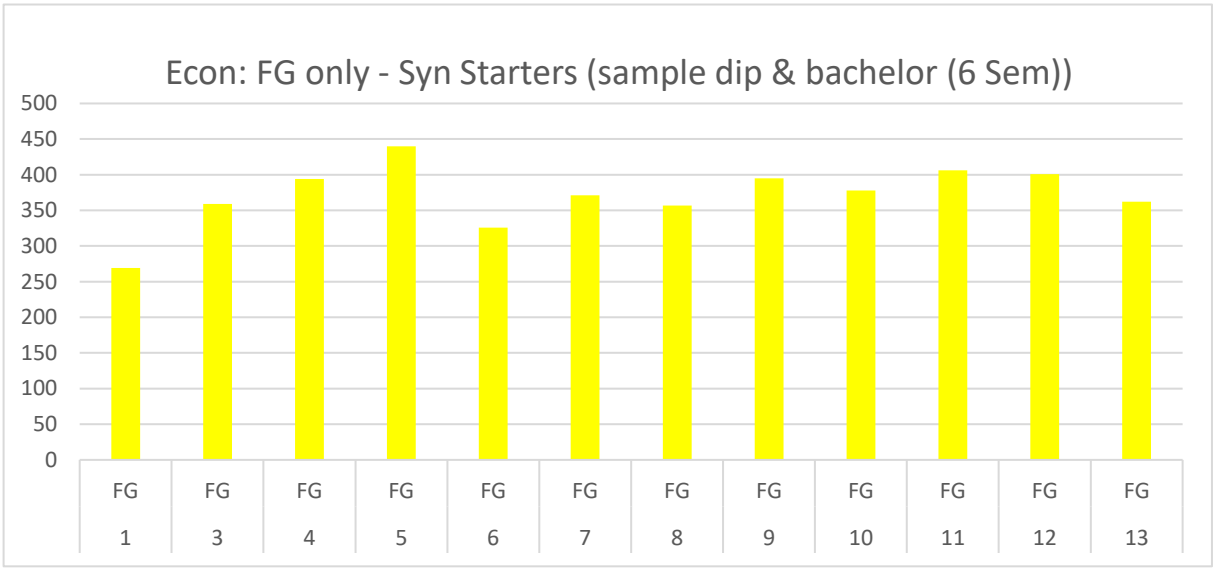
Source: FDZ – Own illustration

Data for previous cohorts could either not be released because there were not enough students in the bachelor, or the students were opting for the diplom. Unfortunately, due to reasons of access to data, duration of programmes is excluded. The next section presents the data for economics.

6.5.2 Econ: FG Synthetic Variable, Six-Semester Registrations

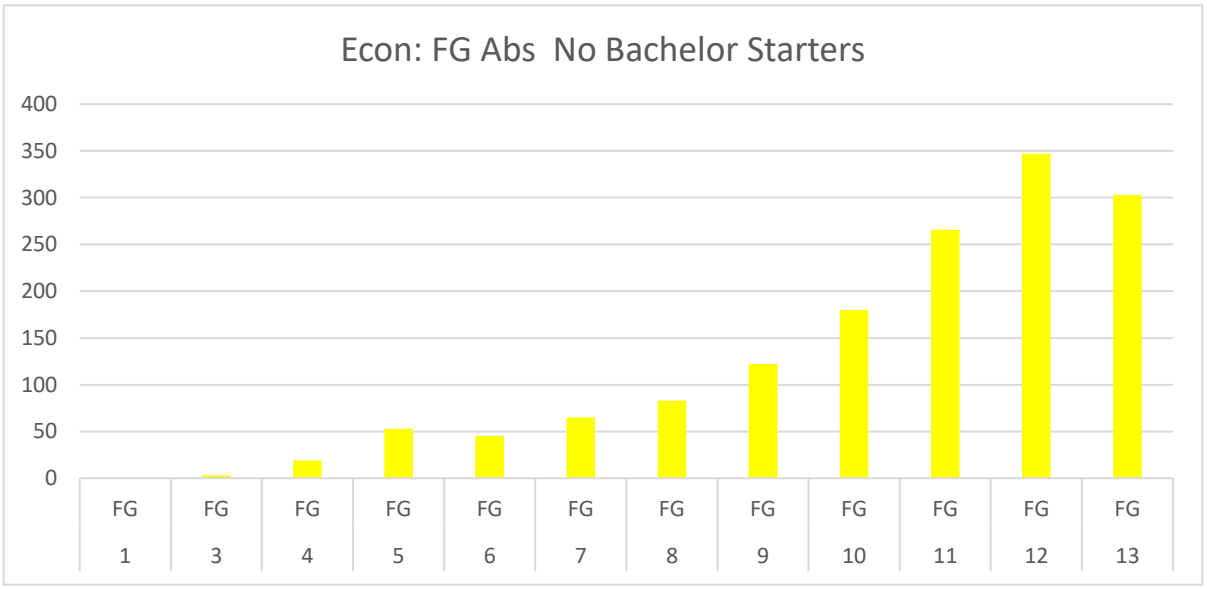
The following paragraphs and graphs will present the position of the FG-students in the second of two fields of study reporting the FG-students' success rates. Using the same sample as in economics for the GG- and FF- students the data graph the developments of the FG-students over the 13 cohorts. Graph 6.5.2.1. shows an initial increase in the FG-student starters from cohort one to cohort five and thereafter a drop, and with n= 326 FG-students in cohort six then rising and then culminating with n= 362 FG-student starters in cohort 13. When following the graph of the bachelor starters in this field, there is an identifiable constant increase up to cohort 12 with n=347, which is then followed by a drop in the bachelor registrations to n=303 registrations.

6.5.2.1 *Econ: FG students first-semester registration – synthetic variable*



Source: FDZ – Own illustration

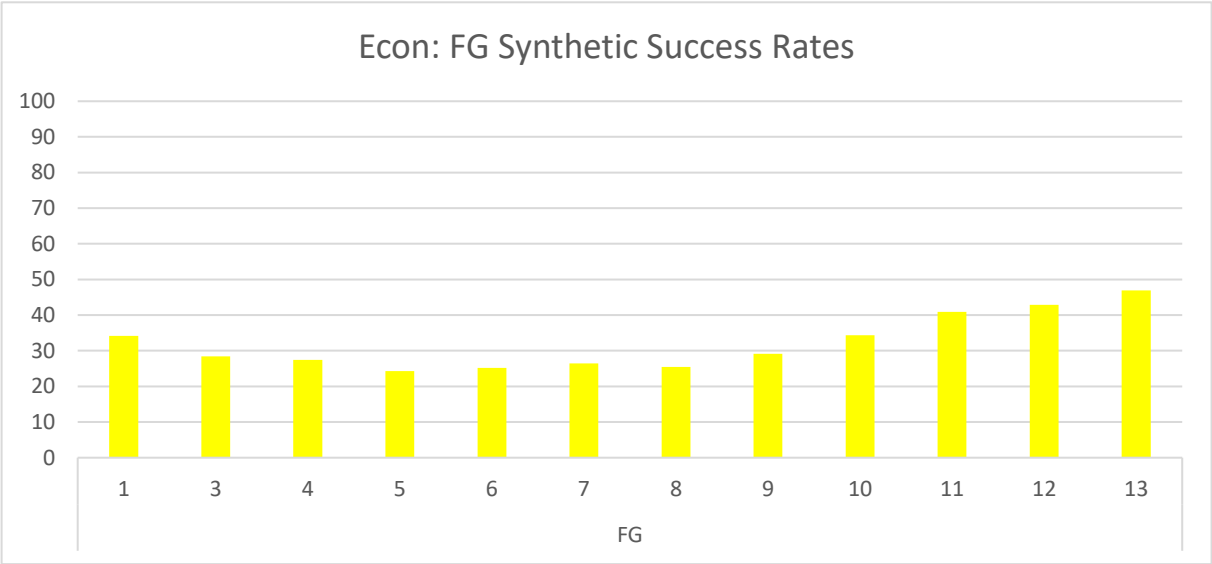
6.5.2.2 *Econ: FG students first-semester registration – bachelor*



Source: FDZ – Own illustration

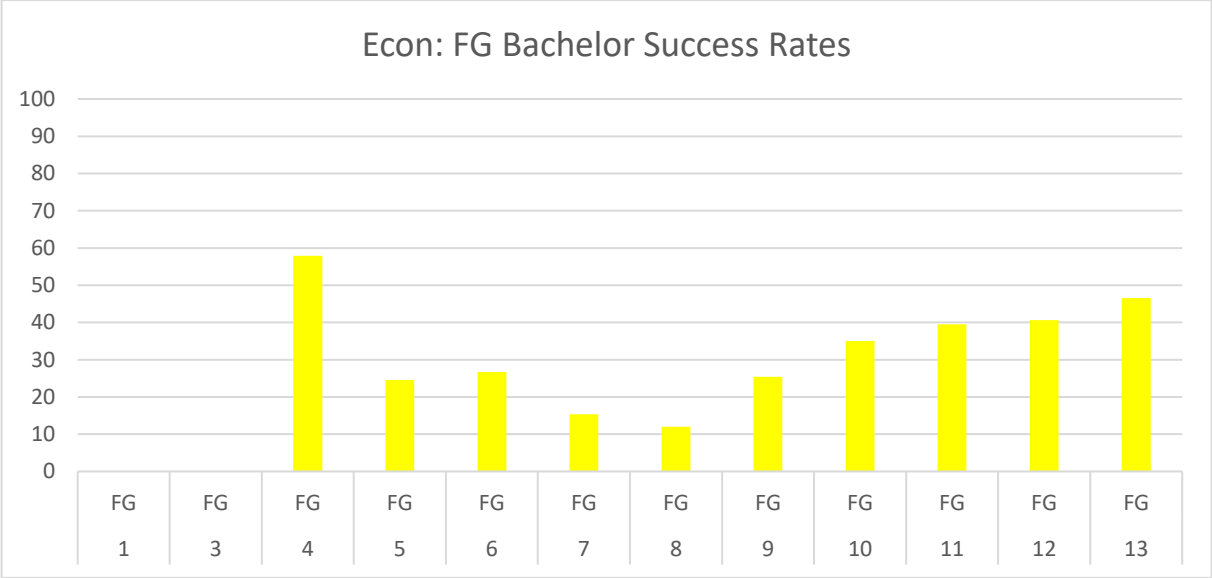
Of the FG-students that register in each of the cohorts, their success rates are graphed in the following two graphs (6.5.2.3. and 6.5.2.4). In cohort one, the synthetic success rates were calculated as being 34,2% and culminating in cohort 13 with 47%. In comparison to the GG- and FF-students, the FG-students have consistently produced lower success rates than those produced by the other two groups with an overall average success rate of M = 55,6% for the GG-students; M = 43,3% for the FF-students and M = 32,1% for the FG-students.

6.5.2.3 *Econ: FG Syn Success Rates in the Sample HEIs*



Source: FDZ – Own illustration

6.5.2.4 *Econ: FG students' success rates – bachelor*

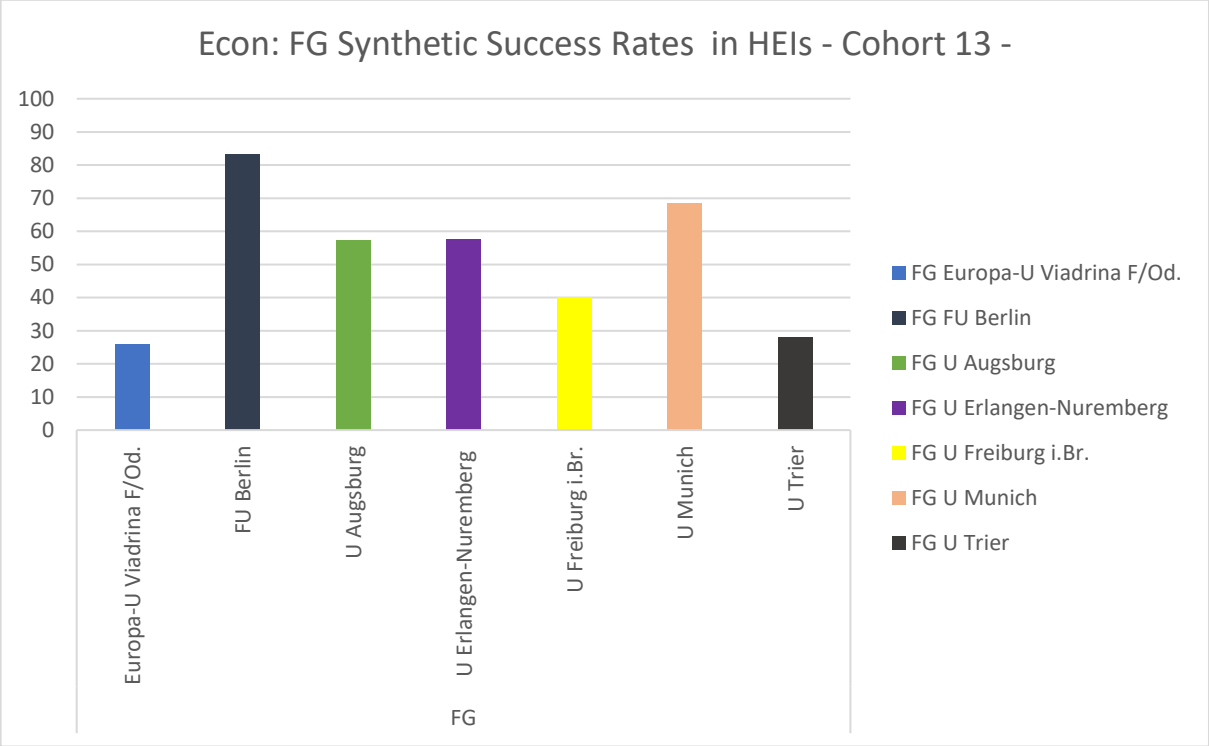


Source: FDZ – Own illustration

The bachelor success rates begin with almost 60% in cohort four, then with a drop and at a low in cohort eight, but then continue to rise to 46,5% in cohort 13, in comparison the GG- and FF students had an average success rate of. In the sample, the rates are aggregated with a sample of HEIs. Those individual HEI success rates that could be released for cohort 13 are graphed in 6.5.2.5. where the FU Berlin manages that the FG-students' success rates exceed 83%, whereby the Europa-Universität Frankfurt Oder with its FG-students manages just over 25% success rate. These are similar to the synthetic success rates of 36,7% for the GG-students;

25,8% for the FG students and 21,6% for the FF-students. Thereby showing that here, the synthetic success rates are the same as the bachelor success rates for both the FG- and FF-students (gg-students bachelor was not released). Moreover, in this case, even though individual cohorts are not a strong indicator, the data shows that the FG-students did produce better success rates than the FF-students in the bachelor and synthetic success rates.

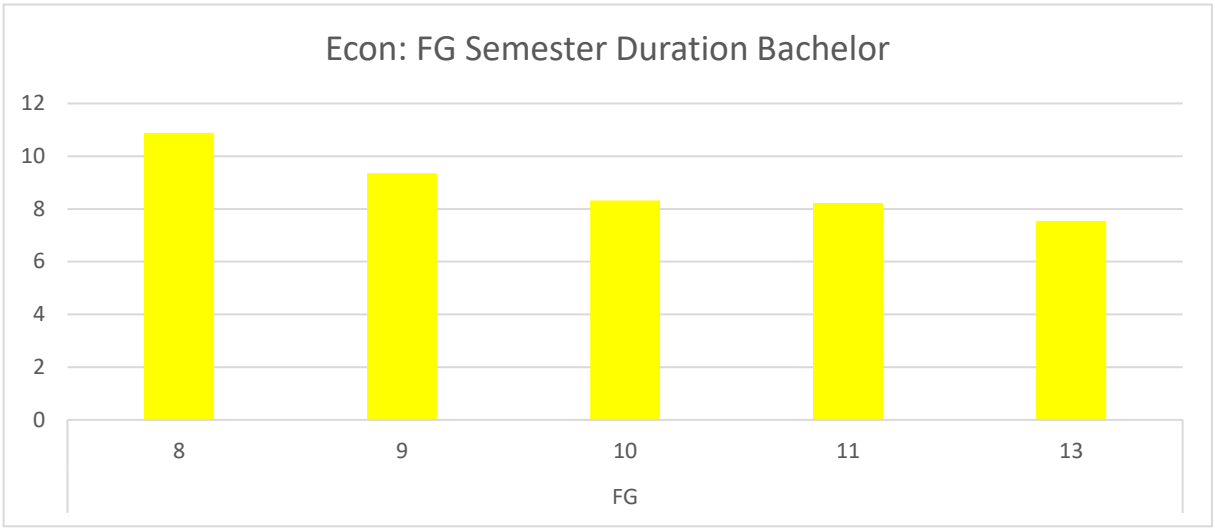
6.5.2.5 *Econ: Syn success rates FG students only - Individual HEIs*



Source: FDZ – Own illustration

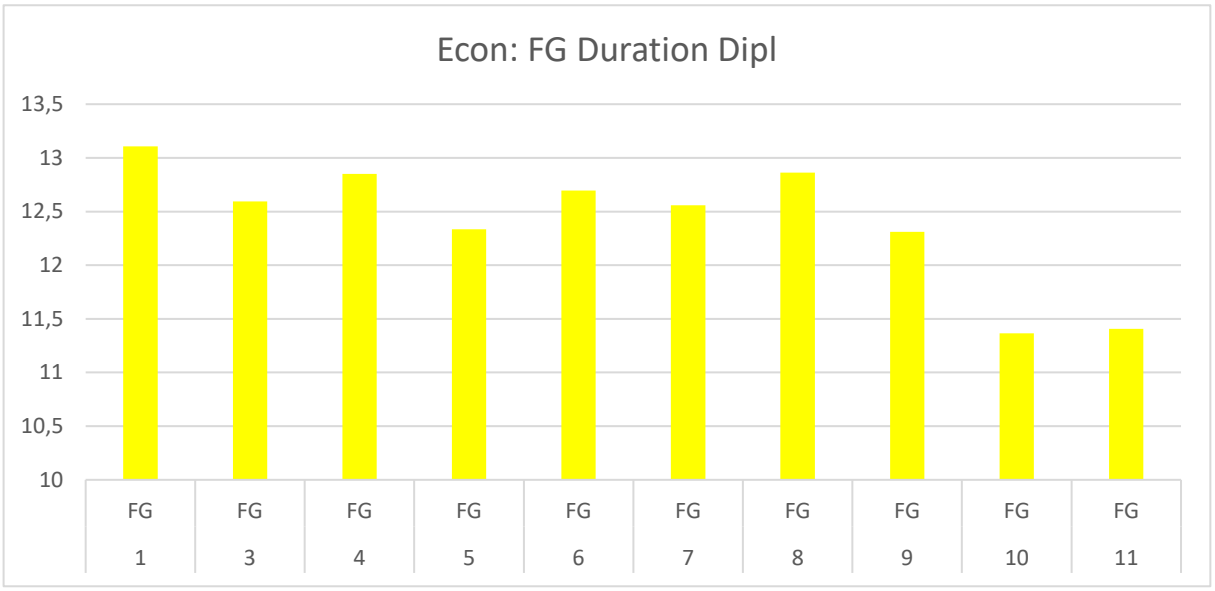
The duration of time needed for the FG-students to successfully complete their bachelor (6.5.2.6) dropped continually from over 10-semesters in cohort eight to an average of M=7,5 semesters in cohort 13 for the FG-students. The drop was similar in the diplom duration for the FG-students which is graphed in 6.5.2.7, where the FG-students in cohort one needed just over 13 semesters to complete their programme. By the 13th cohort, the average duration for the completion of the diplom was M = 11 semesters in cohort 11.

6.5.2.6 *Econ: FG students only - Duration Bachelor*



Source: FDZ – Own illustration

6.5.2.7 *Econ: FG students – duration diplom*



Source: FDZ – Own illustration

6.6 **Interim summary FG-Students**

The FG-students success rates in the synthetic variable and the bachelor variable are similar, this implies that both the diplom and bachelor produce similar success rates for this group of students. These comparative results differ from both the GG- and the FF- students, and also the success rates of the FG-students in mechanical engineering and economics are lower than those of the GG and FF-students. The following section takes the analysis one step

further and compares the fields of study, where possible. It also uses the official data, from this chapter, to address the duration of the study programmes and the pass-fail situation of international students, whereby the comparison focuses on comparing international students' also according to their region.

6.7 Overview and further analysis

This work now will move forward and further analyse the student groups in Germany's HEIs that will assist in the discussion of the results. The official data include variables that help probe both the similarities and differences in success rates and allow for testing, where possible, if there are correlations between success and year, the field of study, HEI, bachelor, diplom, region or country of origin. The next paragraphs will further compare the three fields' success rates within and between the groups. Where possible, the region or country will be included in the analysis[126].

The previous chapter presented the success rates of the GG and FF-student groups. The success rates for the FG-groups were also presented. The first-semester registrations were presented in the synthetic variables. It is visible that in mechanical engineering, the FF-students' success rates are descriptively comparable with those of the GG-students. Indeed, with the 13 cohorts in the sample for mechanical engineering, the better success rates for the FF-group was not just at one point in time, but in multiple cohorts.

The duration of time needed for completion of the diplom, and bachelor were presented. The dispersion of their duration around the mean was also presented and was greater in the FF groups in comparison to the GG-group of students. The sample was larger for the gg-groups than for the international students. The GG- groups in both bachelor and diplom had an average duration that was closer to the regular study time assigned to the study programme by its organisers, and the dispersion was smaller showing homogeneity amongst this particular group. Now this work will proceed to compare the fields of study and analyse the introduction of the bachelor and the success rates in the samples tested.

[126] In the following, where a different approach uses a different sample (for example all HEIs) this will be specified.

6.7.1 The three fields of study

The aim to facilitate an increased number of students in accessing and achieving higher education attainment and the quality of education is never a closed chapter. In general, to date, there is an increasing number of students in Germany, and on a global scale (see chapter three[127]). Addressing the success rates in the different fields of study and comparing their success rates lends to a better understanding of how HEIs students succeed and how the number of incoming students relates to the number of graduates. This in turn is relevant for the labour market, as the number of graduates is, in the cases shown, not equal to the number of registrations.

Mechanical engineering, electrical engineering and economics are three fields that are amongst the most populated fields of study in Germany's HEIs. Analysing success rates also begs asking about our choices in education, and what we think are the choices international students might make. How do the registrations in the frequentet respective fields of study relate to each other? Do the international students' success rates present comparable results between the fields of study? And are there similar developments in the synthetic success rates? All the above questions are relevant to understanding why a student chooses to study, and what a student chooses to study, and how this is reflected in the HEIs respective success rates. They are not necessarily *all* answerable with the official statistics but by probing and comparing, the work can draw some parallels and make some inferences.

Increasing absolute numbers of student registrations implies a positive standing of Germany with regard GG-students, FG-students, and FF-students. A decrease in the number of registrations in the fields demands asking is there a decline in interest or what demographical developments explain the falling numbers of registrations. The registrations have not maintained a constant increase, and according to the Destatis data 2019, the number of first-year registrations in mechanical engineering has been declining[128]. A declining number of registrations has been an issue in the US (Nietzel 2019) for the past number of years. This is also true for the starters in the groups of HEIs in economics students, and also to a lesser extent for the electrical engineering students[129]. The registrations and the success rates of the

[127] Based on the official statistics presented in chapter three, four and five.

[128] Artikelnummer: 5213103208005 showed a relative decline of first year registrations in comparison to the previous years, and that over a period of five years, in 2019 there was an increase for electrical engineering. In computer science the number of first year registrations has been consistently increasing. (Destatis 2019)

[129] Destatis show a drop in the number of first year registrations overall, from wi/se 2017 – so that both 2018/19 and 2019/20 show a decline in overall registrations. Also 2018/19 showed an overall drop in the number of students registered in the subjects Economics and Business Management.

international students are of paramount importance, in particular when the labour market seeks qualified graduates. Knowing the success rates of the student body allows the labour market to assess the number of graduates that can be expected to complete. When the registrations decline and success rates do not improve, it compounds the problem of having a dearth of graduates to serve the labour market.

The international students' success rates are the ability of international students to succeed in Germany's HEIs. The registrations and the success rates are relevant for reflecting the standing of Germany's qualifications, globally, also because of the international students' interest in the different types of degrees. In the mechanical engineering synthetic starters, there was a continued increase in the number of GG-students and FF-students starters, but then the registrations evened off in the latter two cohorts. The interest in ME seemed to peak in 2011 and thereafter went into a steady decline. A similar peak was in EE with a smaller decline that seems to be evening off, unlike, however, in ME which seems to continue to decline. Neither of these fields are as popular as economics. The success rates of the international students show how comparable the international and GG-students are in all three of the fields of study, and over time.

Hence the relevance of describing the absolute number of students over the period of 13 cohorts lends to identifying if, with the course of time, and the timespan used, a trend is identifiable. By analysing the success rates in these cohorts, the work provides information on international students' success, their success rates, and seeks to identify if there is a trend regarding the international students, and their registrations in the different fields of study. The previous pages described the registrations and the success rates in the different groups. The following will address discrepancies between the different international students according to their region of origin, fields of study, and how this developed over time. It will begin by comparing the GG-students and FF-students, and then progress to the inter-regional comparison. As presented in chapter three, the work will continue to address what the success rates of international students are in the different fields of study. Also, how do the international students' success rates compare to the GG-students in the different fields of study. Furthermore, it will analyse if there is an identifiable pattern or trend in the international students' success rates using the 13 cohorts in any of the three fields of study.

6.7.2 Student registrations, time, and success within the fields of study

This subsection addresses the registrations and success rates. The purpose of this is to address the idea of having policies that aim at increasing the attractiveness and

internationalisation of the HEIs. Where HEIs envisage that having international students is a part of their internationalisation process, the increasing numbers of international students registering and succeeding would reflect a successful internationalisation policy.

Considering that the point of introducing the bachelor was to reduce the time needed to qualify, facilitate the movement of students amongst the Bologna signatories due to mutual recognition, and facilitate an increase in qualified students, one would expect a positive correlation between the success rates in the synthetic variable and the cohorts because more students should be more capable of registering and theoretically completing their respective programmes. Of these students, there should be an increasing number of not just German students but also international students, because the mutual recognition, as a part of the internationalisation process, should make it more attractive to come to Germany. Furthermore, with the geographical expansion of the EU, the movement should be more feasible which means with the progression of time more students could avail of studying in Germany because it should have become more accessible. The variable time was defined according to the year when the data started to be technically registered. The recording of data in this format began in 1995 and with each year the number / or time increased, based on this, the variable cohort was created. The work set out to also analyse, where feasible, if the cohort variable, which represents a progression in time, correlates with registrations for each of the groups: GG, FG and FF students.

For the progression in time and analysing the first student registrations, a correlation was carried out. In all three fields of study, Pearsons[130] correlations of the variable synthetic starters and cohort showed a strong positive relationship, and the values were significant, with two exceptions: for economics FF-students and FG-students. The latter two groups showed declining numbers in the student registrations for cohorts 11, 12 and 13. Possible reasons for the decline are growing interest in other areas or fields. It cannot be ruled out that declining registrations is related to success rates, or to on average longer time needed to complete in comparison to the recommended time-to-completion.

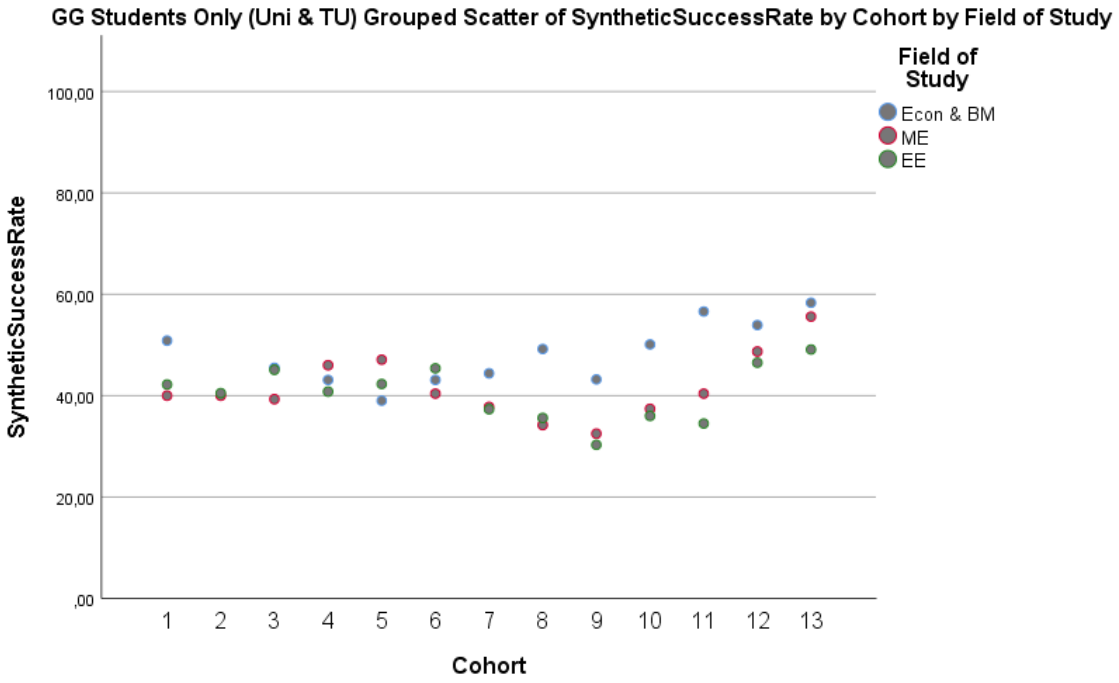
Moving on to the success rates, the following shows all cohorts and the synthetic rates using all three fields of study and all three student groups: GG, FG, FF in the university and technical universities. The point of grouping the results is to give an overview of the general situation. The GG-students have success rates over the whole period, ranging from MIN = 30,3% to a MAX = of 58,3%, with M = 43,2%. The international students have a MIN = 32,7%

[130]All the correlations were conducted with Pearsons, but also with Kendalls Tau B and Spearmann's Rho. The differences in the measures of association and significance were minimal – as in weak relations remained weak.

but a MAX =90,0%, with M = 49,2%. The FG group of students have a MIN = 15,5% and a MAX = 47,0% with their mean M = 26,3% (appendix).

The work proceeds by further carrying out and cross-analysing the data [131] according to the GG/ FF groups (6.7.2.1/6.7.2.2). Thereby comparing the groups of students and their respective success rates in all three fields of study. A scatterplot provides information about whether identifiable trends exist in the data.

6.7.2.1 *Scatterplot: GG -ME, EE and Econ for all 13 cohorts, with the synthetic variable*



Source: FDZ – Own illustration

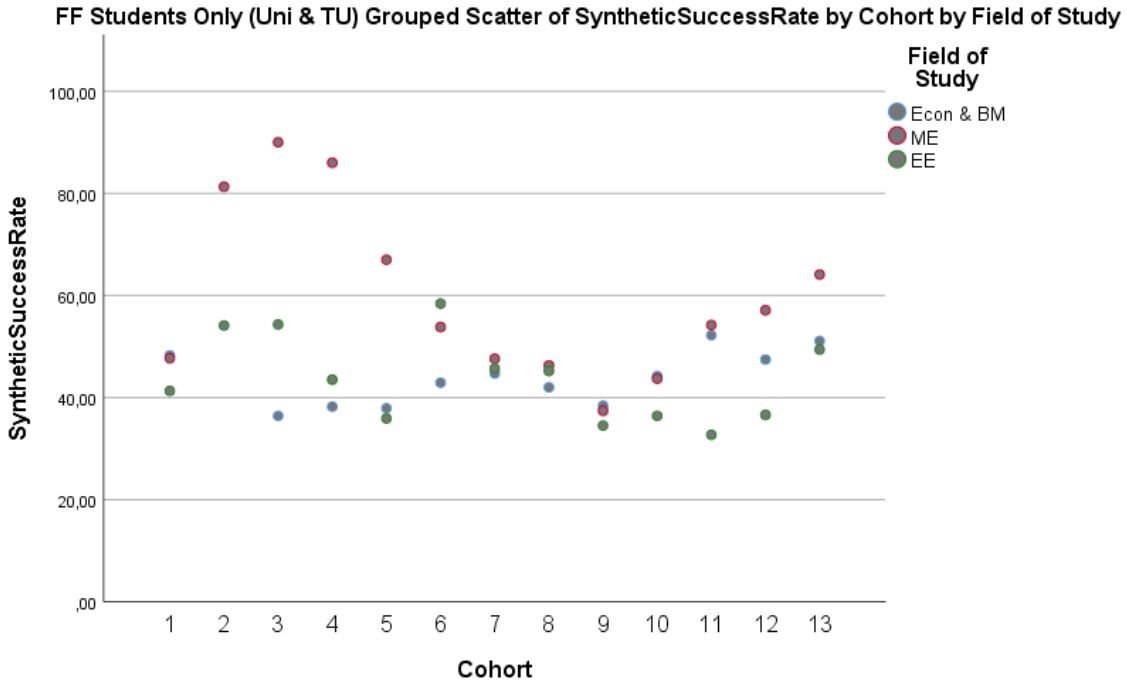
The following emerges: the GG-students' results present economics as a field of study with the better success rates for most of the cohorts in this group, for example for cohort one, and then seven through to 13. However, of the two engineering fields of study mechanical engineering has better success rates for the GG-students in cohorts seven to 13, with the exception of cohort eight. Although both engineering fields have similar rates in each of those cohorts, ME has 55,6% as a success rate in cohort 13, EE success rate falls short of 50%. The comparison shows differences between the different fields for the one group (the GG-students),

[131] SPSS uses the legacy for the scatterplot purposes, but the gpl is better for editing the graphs, with help from the https://stats.idre.ucla.edu/spss/library/spss-librarymaking-graphs-with-the-ggraph-command-and-gpl/ I could use the text to amend my syntaxing.

with the scatterplot the variability of the results is evident – and that no real trend can be identified. Furthmore, the plotted data shows that the HEIs do not even reach a 60% success rate.

For the ME FF-students the success rates fluctuate so that at the start the success rates are quite high, in cohort two, mechanical engineering produces a success rate of 81,3%, in electrical engineering, it is 54,1%. In cohort nine the rates drop and are at a low for all three fields of study with 37,4% for mechanical engineering, 34,5% for electrical engineering and 38,4% for economics. Then the rates begin to improve whereby mechanical engineering shows better success rates.

6.7.2.2 *Scatterplot: FF -ME, EE, and Econ for all 13 cohorts, with the synthetic variable*



Source: FDZ – Own illustration

The scatterplots show three groups, and their percentage success rates over the 13 cohorts. The two scatterplot graphs indicate that as of yet, there is no clear trend for either the GG-students or for the FF-students. Therefore, using both the bachelor and the diplom allows for all study programme options to cater for the different choices made by the different students in which programme they may choose. Yet the results of the scatterplots show that neither for the GG- nor the FF-students can the introduction of the bachelor graphically display an increase in success rates in any of the fields of study for either group.

Correlating GG-students' cohort and synthetic success rates produced weak results with r = ,272. For the mechanical engineering FF-students the correlation value was r = -,454

showing a negative correlation in mechanical engineering between the cohort and time. For GG electrical engineering the correlation value was r = -,075.

For the FF-students in electrical engineering, the values were similar to mechanical engineering, not significant and negatively moderate r =- ,413. Economics as a field was the only field in the universities where time in the form of the cohorts and synthetic success rates produced significant results. For the gg-students r = ,617 and *p* = ,033 showing a moderate significant result. The correlation value for the FF-students r = ,533 shows a moderate correlation between cohort and synthetic success rates, but the results were not significant. In the success rates for all three fields of study, from the descriptive data, we see that the success rates varied over time. The individual correlations for each of the groups show that the introduction of the bachelor did not contribute to an identifiable improvement in the success rates of any of the individual groups of students. The tabulated correlations are in the appendix.

6.7.2.3 *Econ: 13 cohorts GG students*[132]

Economics GG		Cohort	Synthetic Success Rate
Cohort	Pearson Correlation	1	,617*
	Sig. (2-tailed)		0,033
	N	12	12

*. Correlation is significant at the 0.05 level (2-tailed).

The correlation that exists for the GG-students also exists for the FG-students, where there is a moderate positive correlation between cohort and the synthetic success rates of this group of students. However, from the data, we can read that there is no significance in the correlation in this field of study for the FF-students.

[132] One cohort was omitted from the analysis.

6.7.2.4 *Econ: FG- students*

Correlations

Economics FG-Students		Synthetic Success Rate	Cohort
Synthetic Success Rate	Pearson Correlation	1	,664*
	Sig. (2-tailed)		0,019
	N	12	12

*. Correlation is significant at the 0.05 level (2-tailed).

For electrical engineering, we have cohorts from one through to 13. Using the sample of technical universities and universities. In each of the tests the correlation value was weak, with the exception of the FG-students where the value r = ,318 barely exceeded r = ,3.

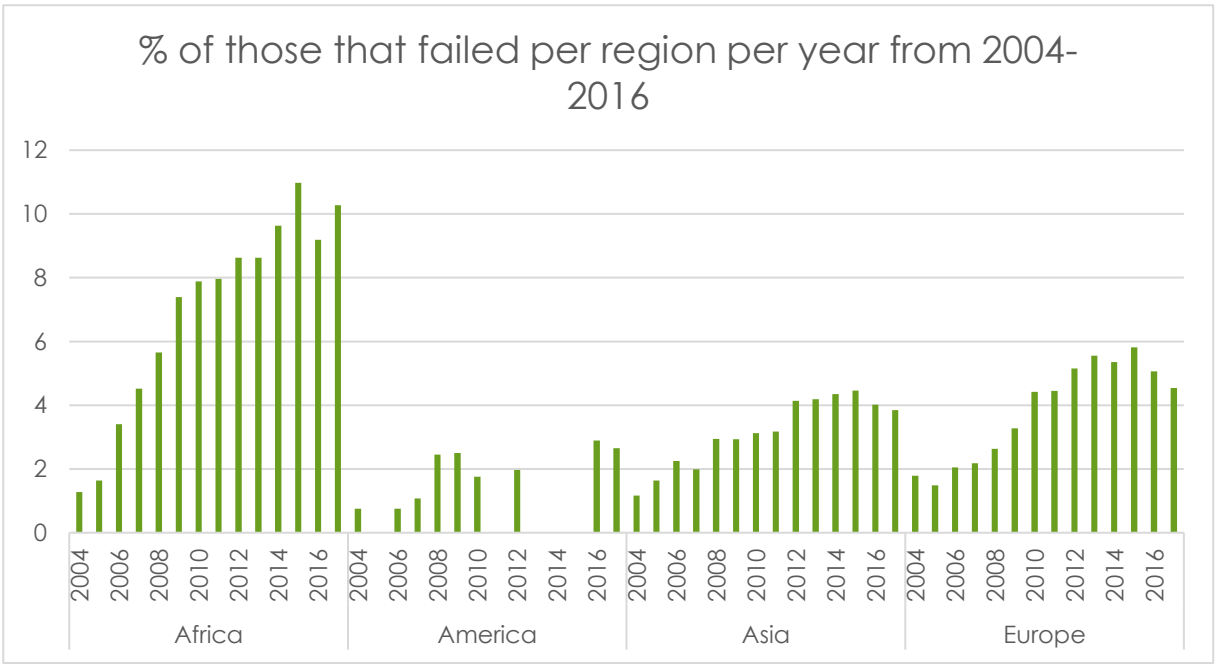
The synthetic success rates over in the 13 cohorts varied from group to group, whereby the steadily 'low' rate in all fields of study is consistent in the GG-students and FG-student. The haphazardness of the internationals students' success rates is visible in the scatterplot presented. By 'low' success rates, the work presents the non-improving rates, or not identifiably improving rates. This is for a large portion of the GG-students over a long period of time in both degree formats. The synthetic variable ensures that the analysis is not omitting one degree type or the other but encompassing all those who chose to uptake a study programme, theoretically, with the intention of passing that programme. Therefore, the point of the analysis with the synthetic cohort shows that, on an individual level, the introduction of the bachelor has not correlated with an explosive increase in international student registrations or an explosive increase in international students' success rates. In order to further find out what else, apart from time, impacts the students' success rates, the work will analyse the pass/ fail rates in the following section.

6.7.3 Pass /fail – all fields of study – comparisons amongst international students only

This, and the following subsection provides for comparisons amongst and between the international students only. The previous chapters presented results that the international students in part, provide for better success rates than the German students. Here the data limits itself to the international students, as they are the focus of this work. Where analysing is not carried out in a field it is a result of limited access to the data or data restrictions.

The data provide information about international students' examinations that were passed, but also about examinations that failed. The point of addressing the failed exams is that those who failed are not included in the success rates. Therefore, it is relevant to analyse the failed exams of the international students. In order to gain a different insight into the results, this short section looks at the exam data[133] only and divides the examined full-time students according to region. The first step uses the exam data from 2003 to 2015, which is a more general overview. For the second step, only the field of study, economics, and its exam data from 1995-2015 with the bachelor and diplom degrees is used. In both steps, the selection is based on using all the cases in the exam file and including all HEIs[134] and taking the region as a base of 100%.

6.7.3.1 *Percentage failed - exams all fields of study, all exams according to region. All HEIs.*

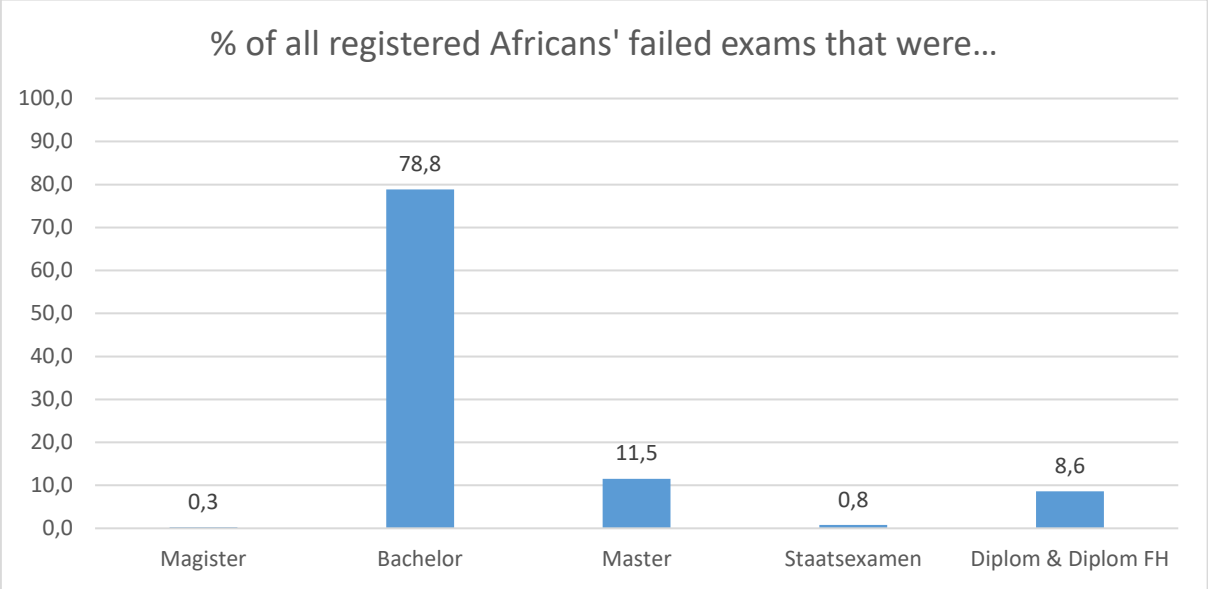


Source: FDZ – Own illustration

[133] This is based on exams from 2003-2016, as access to the older data was discontinued.
[134] Including Universities and Universities of Applied Sciences.

Graph 6.7.3.1. breaks down the percentage of failed exams (all fields of study) according to region. Again, here only the internationals are compared, with the purpose of identifying if there are differences according to region. The data graphs an increase in the percentage of failed exams in all the regions, whereby the increase is greater amongst the African students in comparison to either the American[135], Asian or European students.

6.7.3.2 *African Failed Examinations Only – All exam types – 2003-2016*



Source: FDZ – Own illustration

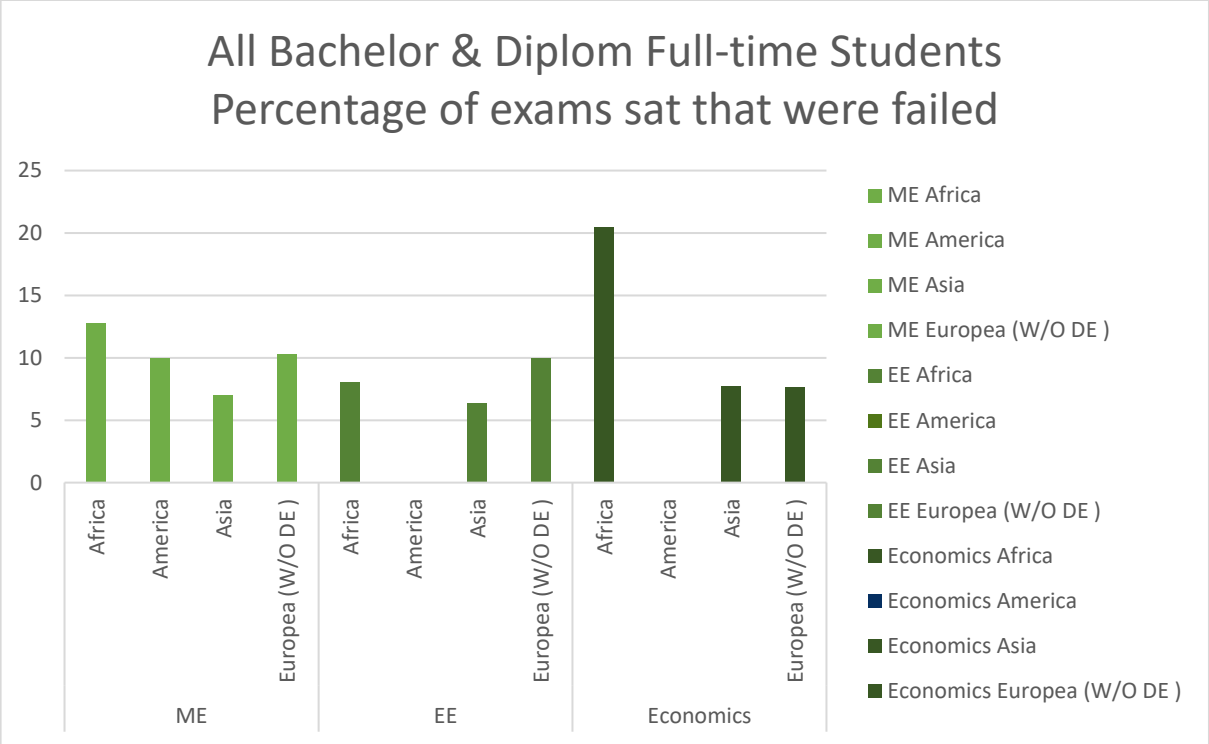
In order to analyse the type of exams that were failed by the African students, graph 6.7.3.2. illustrates the breakdown, such that almost 80 per cent of the failed examinations belong to the bachelor examinations, the master and then the diplom failed examinations make up 11,5% and 8,6% of the failed examinations in all field of studies. The graphed data does not differentiate according to the field of study but as presented in chapter five, economics, as a field of study attracts the most students – GG, and FF, students.

To take a closer look at how these transfers into the sampled fields of study the following graph narrows the focus to further address differences between the fields of study according to the different regions of international students. Graph 6.7.3.3 shows the three fields of study and four different regions with only the international students in the sample. The point is to analyse what the fail rate is in each of the fields of study. Here, fail is used as those registered as examined and finally did not successfully complete their exam. What is striking is that in economics the Asians and Europeans show similar fail rates, both with about eight per cent fail rate. However, in economics, the Africans' fail rate is over 20%. In electrical engineering and

[135] The missing bars are due to non-release of data.

mechanical engineering, the fail rate between the groups ranges from seven to 13 per cent in mechanical engineering, and six to 10 per cent in electrical engineering. The difference in economics shows that 20% of the Africans that sat a bachelor or diplom exam failed.

6.7.3.3 *Percentage failed - exams in this field of study according to region. All HEIs.*



Source: FDZ – Own illustration

6.7.4 Pass /fail – Economics – 1995-2015

Continuing with only international students, and in using the exam data from 1995-2015, with economics full-time bachelor and diplom students to specifically focus (6.7.4.1) on the examination type the following results emerged. Where a region total's 100%, for three of the four regions (Europe, America, Asia) between 4-4,5 % of the exams were failed bachelor exams. For African international students, on the other hand, of all those exam cases 14,6% of the exams sat were failed bachelor exams, whereby 2,6% were failed diplom examinations. Possible reasons are that the diplom demanded a greater commitment before coming to Germany – the student knew that they were committing themselves to a longer programme, therefore the motivation was possibly greater. The per cent of Europeans and Asians that sat and passed their diplom (roughly 61%) or bachelor (roughly 33%) is similar. America, as a region, has results showing passed exams in diplom/bachelor (51% / 44%). This covers all 13 cohorts but also shows that the majority of exams were diplom and not bachelor exams.

6.7.4.1 *Econ: Pass/fail Econ/Bus.Admin – Percentage distribution of exams in this field of study according to region. All HEIs.*

Econ: 20 Years % Pass/Fail	Europe (w/o Germany) % Pass/Fail	Africa	America	Asia
Bachelor – Failed	4,0	14,6	4,3	4,5
Diplom - Failed	1,3	2,6	0,8	1,8
Bachelor – Passed	33,4	42,2	44,0	32,7
Diplom - Passed	61,3	40,6	50,9	60,9

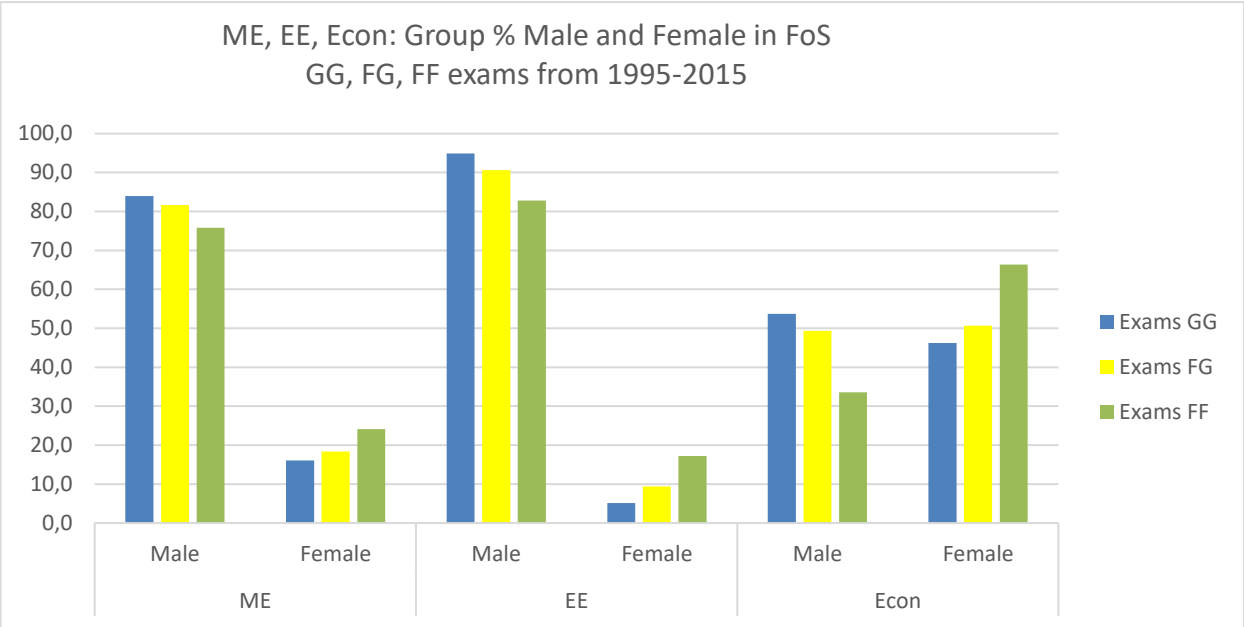
Source: FDZ – Own illustration

The pass/fail is relevant to the analysis of international students' success rates, also in identifying differences between the groups. The results in this short section show that differences exist in the fail rate between the degree type and the region.

6.7.5 Gender

The descriptive data reflects the literature concerning the deficit of females in mechanical and electrical engineering.

6.7.5.1 *Econ/ME/EE: Based on all exams – Female/Male per GG/FG/GG*



Source: FDZ – Own illustration

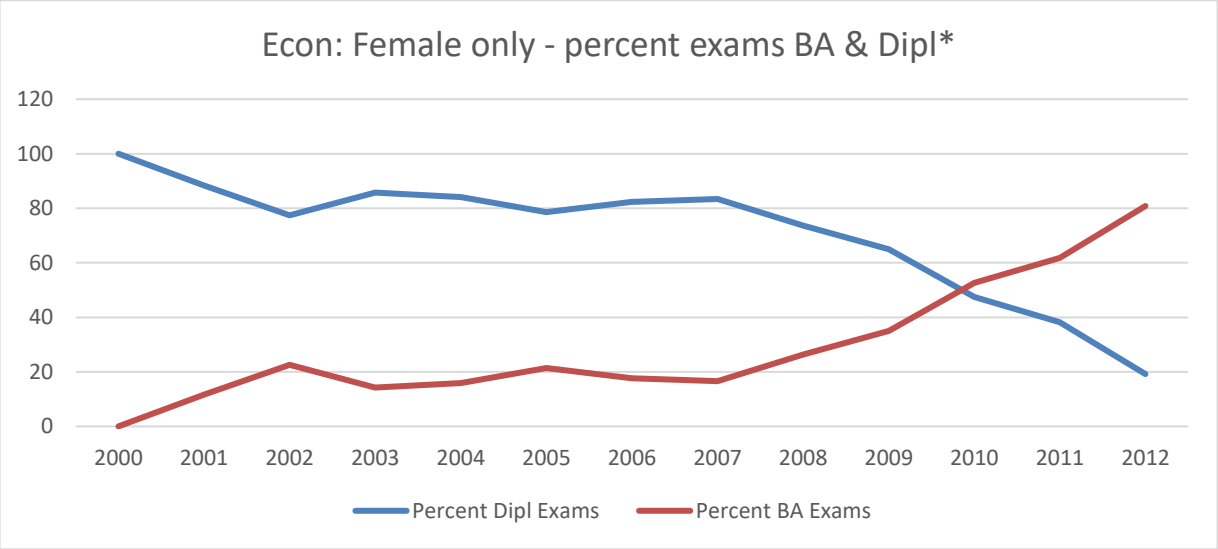
The descriptive data (6.7.5.1) refers to the complete timespan of the 13 cohorts. What the descriptive data show is that there are more international female students choosing economics in comparison to their male international counterparts and that this discrepancy is reversed in the engineering fields of study for the international students. However, there are international

female students in both of the sample engineering fields of study, the percentage of which is quite low, but the percentage is greater than the GG-female students. The presence of international female students in the engineering fields needs further addressing (McGrory, forthcoming) because of the potential that this can contribute to the supply of students and the success of the student group as a whole. The next paragraph focuses only on economics due to the smaller absolute numbers of females in the engineering fields[136].

In previous sections both bachelor and diplom were presented, and although it is not conclusive, the international students were present in both diplom and bachelor programmes. Furthermore, the synthetic variable also could better success rates than the bachelor. The data could also show that there are an increasing numbers of international female students that register in the different fields in Germany.

Using just the international female cases in bachelor and diplom in economics a graph (6.7.5.2) shows the higher percentage of successful exams were in the diplom rather than the bachelor.

6.7.5.2 *Econ: International Female students only*[137]



Source: FDZ – Own illustration

The results show that the international female students' success rates reflect the previous results of a slightly stronger relationship between success and the diplom over that of success and the bachelor for the female students. However, this is also to be explained through the larger share of female students that were successful in the diplom. Here too, the work identifies that

[136] Due to data restrictions and limited access to the data centre due to covid I choose to readdress gender in the engineering studies but with other cohorts, and because of this the work is a paper that is due to be published in 2022. (McGrory, forthcoming).
[137] The sample is the Econ HEI sample used in previous subchapters.

there is a need for further analysis of gender and degree types in order to make a conclusive assessment of the relationships.

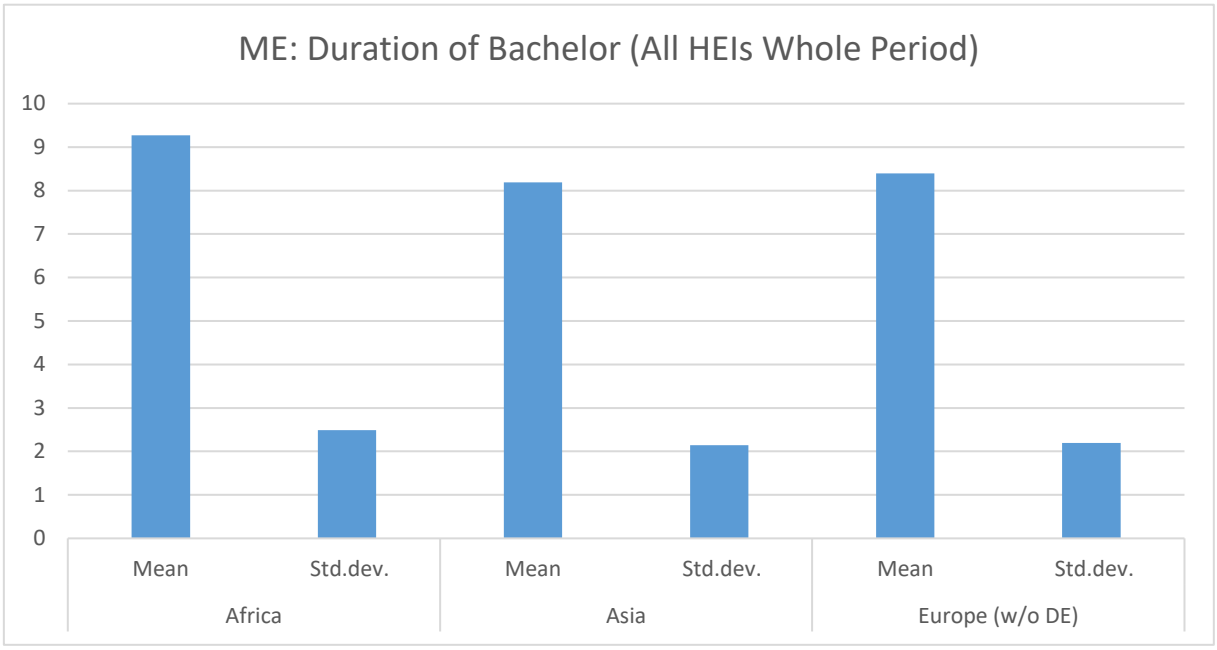
6.7.6 International only: Regions / Country of origin – Duration of study time

An international student corpus is a diverse group, coming from a wide variety of cultures and their respective status is diverse – some will need a visa some will not. Being an international student can mean many things and with the data, we can identify different types of international students. If we break the international students down according to the regions (as defined in chapter four) then differences emerge in the duration of time needed for the completion of the bachelor and the completion of the diplom.

Illustration 6.7.6.1. shows the average amount of time for students completing their mechanical engineering bachelor programme in the selected sample. It also includes the standard deviation, the point being to show the similarities amongst the European and Asian students, but that the African students' standard deviation is larger than that of the European and Asian students. The smaller number of Africans can contribute to the explanation, as can the greater differences between the African students. The American students are not represented due to the smaller numbers and data protection restrictions.

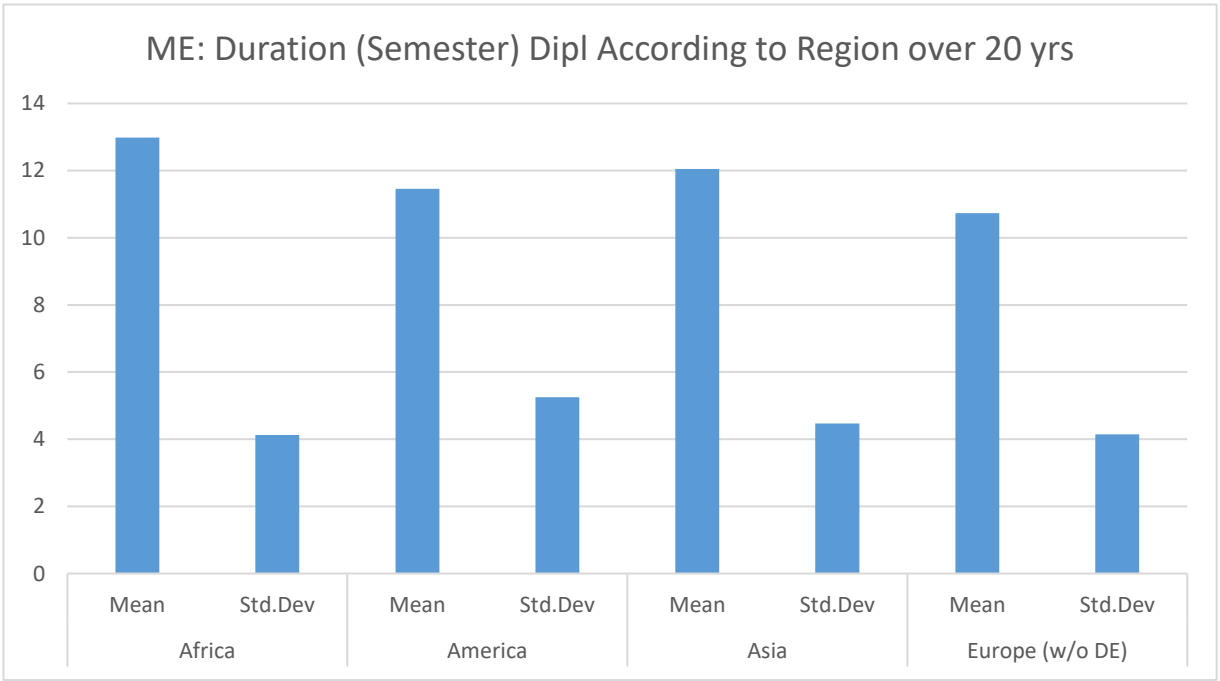
The analysis shows that there are differences according to region. It shows that the Asian students (M = 8,2 semesters) are quicker than the Europeans (M = 8,4 semesters), and that the Africans' (M = 9,3 semesters) take quite a bit longer than the Europeans and Asians as shown in 6.7.6.1. The diplom results are graphed in 6.7.6.2. Here again, the Africans (M = 13,0 semesters) take longer to complete their diplom in mechanical engineering. The Europeans (M = 10,7 semesters) are on average, finished quicker than the Asians (M = 12,0 semesters) in completion of their diplom programmes, this contrasts with time to completion of the bachelor programmes for these two groups.

6.7.6.1 *ME: Duration of bachelor exams according to region. All HEIs full-time,1995-2015*



Source: FDZ – Own illustration

6.7.6.2 *ME: Duration of diplom exams according to region. All HEIs full-time (20 years)*

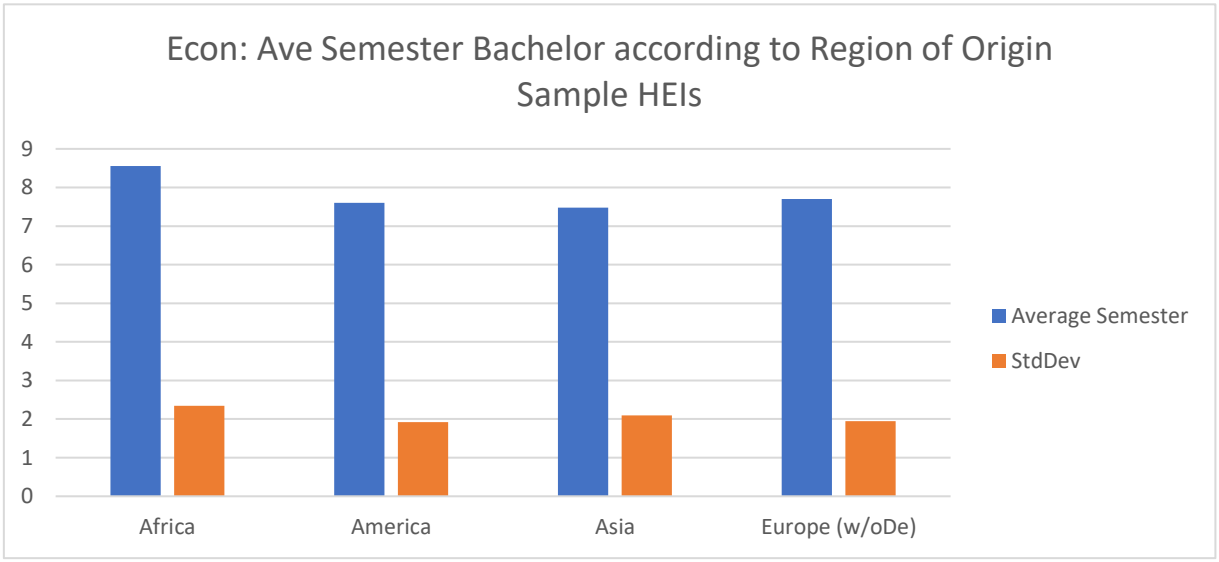


Source: FDZ – Own illustration

The small numbers per regions limits looking at the success rate per region, therefore the following will compare how the regions differ in the duration of time needed for them to complete their programme – whilst the focus is comparing the international students' regions of origin, the sample is not limited to only six-semester bachelor HEIs, but rather all HEIs

offering this field of study. The purpose here is solely to compare the regions and whether there is a difference between the regions. This analysis includes all HEIs.

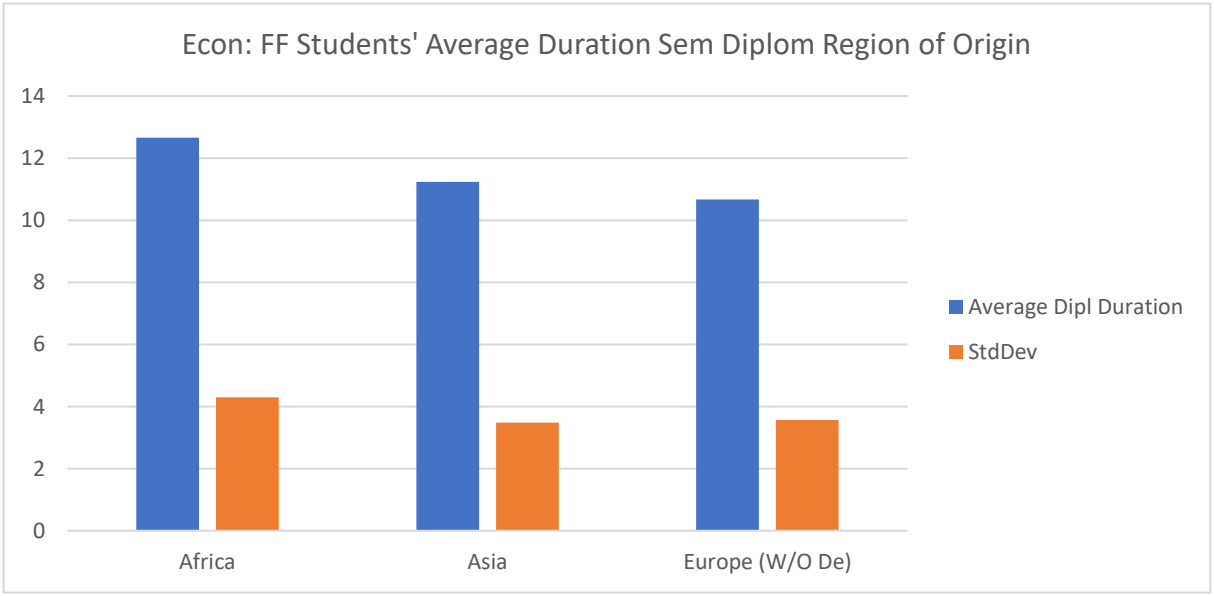
6.7.6.3 *Econ: Duration of bachelor exams according to region. All HEIs full-time*



Source: FDZ – Own illustration

The two graphs (6.7.6.3. and 6.7.6.4) show the respective time needed in this field of study for their bachelor and diplom degrees over the whole period with all HEIs. For the bachelor FF-students in this sample and this field of study, Asian bachelor students take the least amount of time (M = 7,5 semesters), African bachelor students take the longest, with M = 8,6 semesters being needed for completion.

6.7.6.4 *Econ: Diplom average duration according to the region of origin*



Source: FDZ – Own illustration

For the diplom the Asians achieved a diplom in a shorter space of time than the Africans, again this includes all HEIs – the higher standard deviation may be indicative of a greater spread between the university.

Internationalisation is heterogeneous and understanding the diversity by describing the contribution means that this part of the data describes the success according to the international students' regions of origin. This section will specifically start with African countries to present how small the numbers actually are and will then proceed to compare the regions. It presents the registrations for starters and exams in bachelor and diplom, and in the different fields of study. Then the section proceeds to examine one cohort's success rate comparing the different regions. The point is to see the difference in absolute numbers from the regions, and the heterogeneity amongst the international students pending the field of study. The previous paragraphs presented the duration of time needed in bachelor and diplom programmes, in the different fields of study. The previous section also showed the breakdown of the passed and failed according to region and field of study. Africans had a higher percentage of fails in Economics. The African students make up a smaller number of international students in Germany. What contribution their cultural similarities or differences make can unfortunately not be measured with the data, however, the following will break down the countries of origin, because certain African countries have a colonial past, linguistical connections and possibly greater cultural affiliation to the content of Europe than other African countries.

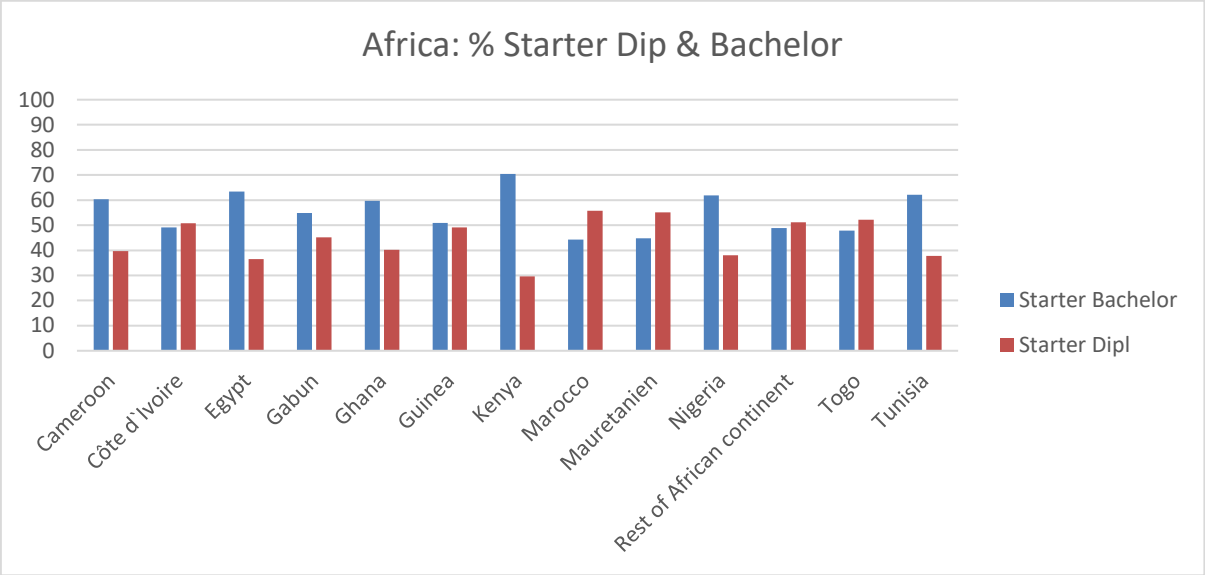
According to Destatis (2009), there were 2711 Africans registered as first semester students in Germany's twenty most populated study programmes. In contrast, there were 12194 Asian first semester registrations (ibid, p.60). That means there are over four times as many Asian as African international students first registrations. Due to the small number of students that come from African countries to study in Germany the focus, in further analysis, will be restricted to two or three African countries, i.e., those with the highest frequencies in absolute number of exams: Cameroon, Morocco and Tunisia.

Previous chapters showed the longer duration needed by those from Africa to complete the (mechanical engineering) exams. There is also ongoing support that the German Educational Ministry also extends to African International students (Makoni 2020)[138] which is another reason to focus on the countries where possible. The following graphs are based on the African students and their exams studying in Germany's HEIs over a twenty-year period. The graphs start with the breakdown in percentage according to the bachelor and diplom, then it

[138] Makoni about loans that African students can access in the SARS-CoV-2-period to help them finance their studying in Germany.

narrows down to our three fields of study, and then further narrows down to specifically looking at mechanical engineering of examined students, the winter starter first semester who registered to study.[139]

6.7.6.5 *Regional Case: African Starter Students in Dipl. And Bachelor – all FoS*

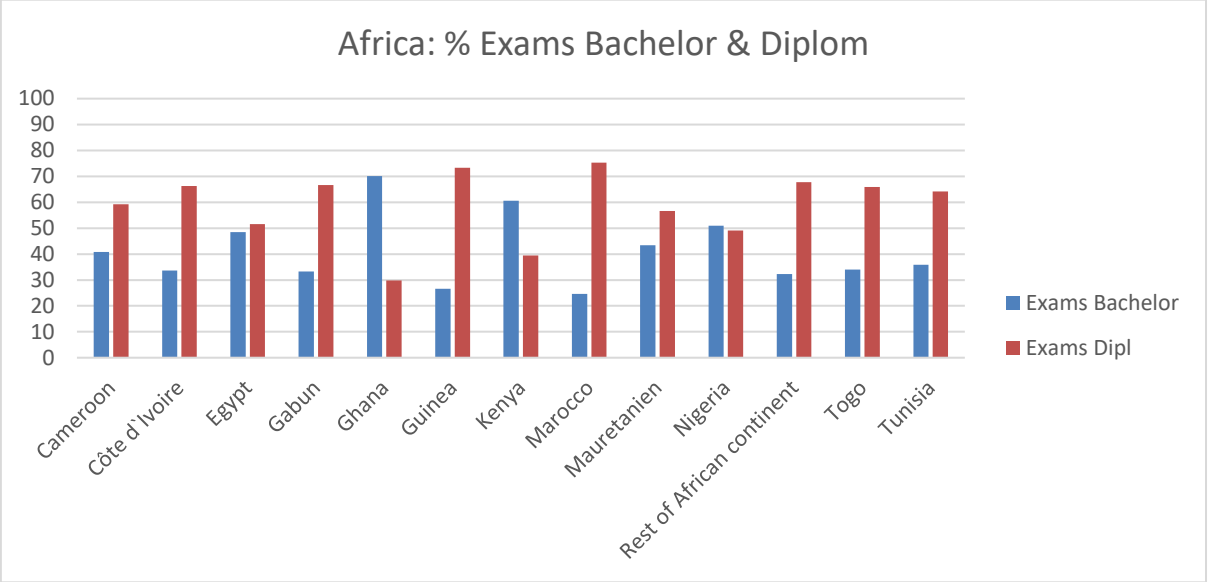


Source: FDZ – Own illustration

Graph 6.7.6.5 shows the African starters in bachelor and diplom programmes in all fields of study. There is a higher percentage of registrations in the bachelor programmes from the majority of the countries. However, in reviewing the successfully examined African students it becomes visible that a higher per cent have completed a diplom.

[139] Based on the fields of study.

6.7.6.6 *Regional Case: Based on all exams – African Countries Bachelor / Diplom*

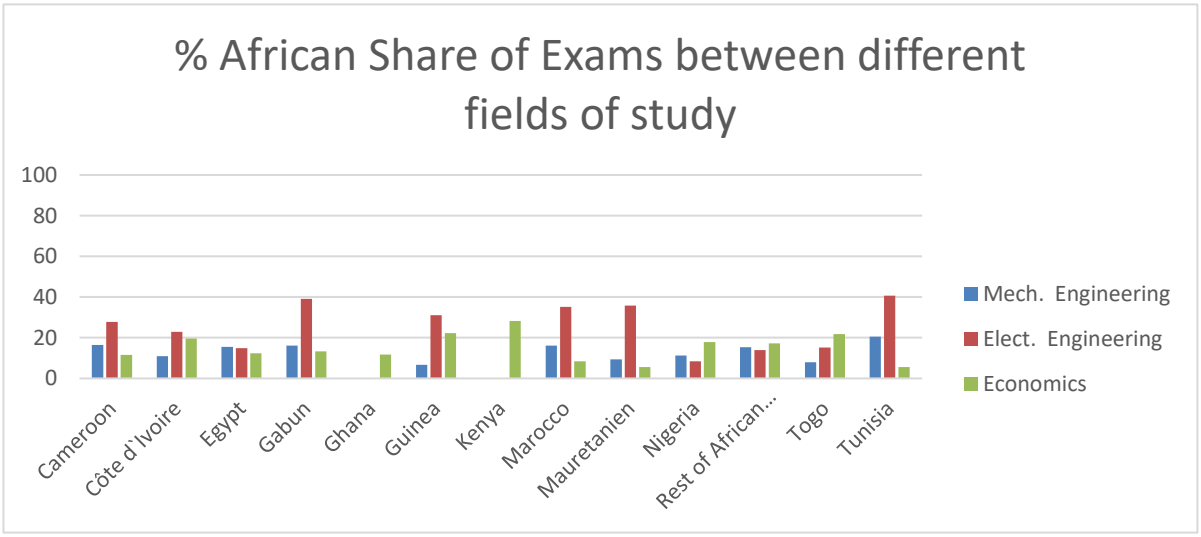


Source: FDZ – Own illustration

*All fields of study and exams passed including model with eight semester bachelor and 10-semester diplom

Graph 6.7.6.6 indicates a greater success with the diplom. This does not rule out that students began in the bachelor and switched to diplom. In the previous chapters, success and time and the duration of the analysis were presented. The above graphs indicate success in the diplom according to the countries, but it is limited according to this one geographical region – Africa.

6.7.6.7 *Regional Case: Percent African Exams Different Fields of Study*



Source: FDZ – Own illustration

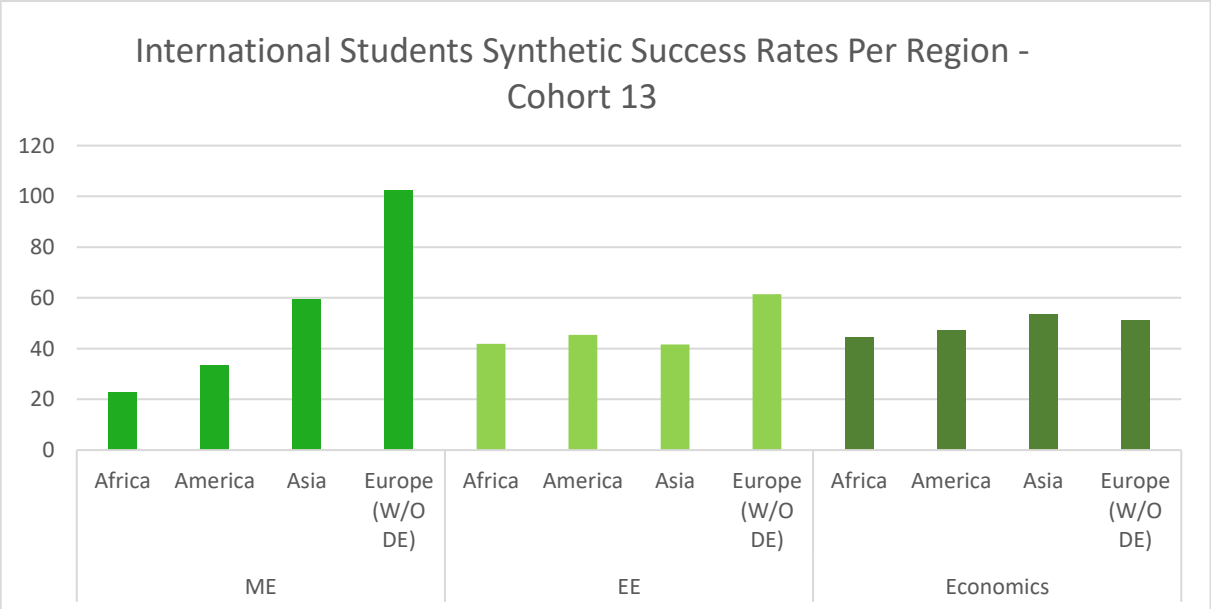
Specifically analysing the results, graph 6.7.6.7 presents a preference amongst African students for the different fields of study. Further breaking down the numbers accordingly

presents their percentage preference, so for example, Tunisians have over 40% electrical engineering exams, meaning that the majority of the Tunisian students that graduate from Germany graduate in electrical engineering.

Comparatively speaking, when looking at the four different regions, and the success rates of one particular cohort – cohort 13 (6.7.6.8), and the three different fields of study the data presents the difference amongst and between the different regions. Cohort 13 is also the youngest cohort; therefore, the majority of exams will have been in the form of the bachelor. From the international students' success rates in cohort 13 the graph breaks down the success rates according to the regions: Africa, Asia, USA, and Europa (Excluding Germany). From the graph, mechanical engineering shows the average success rate as being M = 64%, that the success rates for Africans is 23%, whereas for Asian's it is 59%, and for Europeans the success rate exceeded 100%, in mechanical engineering 58% of the success cases are European, 30% Asian, 10% African, and the rest American. The inflationary success rate for the Europeans in mechanical engineering can, in part, be explained by the case of the double degrees which will be discussed in chapter seven.

In electrical engineering international students' success rate where M = 49%, both African and Asians have success rates with 42%, lying shortly behind the Americans' success rate of 45%, and leading the success rate are Europeans with 61%. However, in electrical engineering 47% of the success cases are Europeans, 23% are African, 27% Asian and the rest are American.

6.7.6.8 *International Only: International Students – Cohort 13 –*



Source: FDZ – Own illustration

In Economics with international students' success rate at an average of M = 51%, the success rates in cohort 13 for the Africans is 44%, for the Americans it is 47%, for the Europeans it is 51%, and for the Asians 53%, whereby Europeans make up 74% of the success cases, and both Africans and Americans only 4%.

6.7.7 International only: Region of origin - Success and degree type in ME and Econ

The data allows for coverage of a timespan where Germany's HEIs where in transition, from the diplom to the bachelor degrees, and that this policy change was in accordance with the Bologna Process. This process was also to facilitate international students entrance into Germany's higher education landscape, and make Germany a more attractive place to study and complete their degrees. In previous subchapters, the data showed the increasing number of international students with time. Time is also relevant because with time there was the shift from a diplom to the bachelor. Due to the timespan of the data it allows the analysis of whether a trend is identifiable or not. This paragraph continues by focusing on the international students only, and mainly in mechanical engineering, in universities and technical universities. Due to the complexities within the HEIs – offering different programmes, the introduction of the bachelor, and the phasing out of the diplom, the following uses also aggregates in the analysis and seeks to identify trends, or relations amongst international students and success rates also the different fields of study.

In 6.7.7.1 the table presents the results of success rates of the international students in two different degree types. The results reflect previous charts showing the international students' success rates in higher education and the positive relation between the success rates and the diplom examination.

6.7.7.1 *ME: International students and exam type*

ME: Correlations international student success cases and exam type

		Success	Success Dipl	Success Bachelor
Success	Pearson Correlation	1	,954**	0,42
	Sig. (2-tailed)		0	0,153
	N	15	13	13

**. Correlation is significant at the 0.01 level (2-tailed).

Source: FDZ – Own illustration

Further correlations (6.7.7.2 – 6.7.7.4) were carried out on the data to show the results of the different regions' success and the countries' success in mechanical engineering. Asia, which according to the data, in this case, is mostly China have strong associations with success, as do Europe.

In terms of countries if we refer to only those cases with significance. The moderate association can be seen in the correlation results for Cameroon, whereas there were strong associations with Asia and also with Europe. This further reflects the descriptive data from chapter six concerning the regions of origin and the success rates, therefore table 6.7.7.2 presents differences in the success rates and their respective relations with respective regions of origin.

6.7.7.2 *ME: International students and region*

ME International Students only		Success	Africa	Asia	Europe	USA	
Success Sum	Pearson Correlation	1	,643*	,903**	,848**	,748*	
	Sig. (2-tailed)		0,045	0,000	0,000	0,021	
	N	15	10	12	14	9	
			Cameroon	China	France	Russian Fed	Turkey
Success Sum	Pearson Correlation		,643*	,857**	,725**	0,415	0,606
	Sig. (2-tailed)		0,045	0,000	0,003	0,306	0,149
	N		10	12	14	8	7

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Source: FDZ – Own illustration

Regarding the different HEIs, the success of the international students is shown in the following table (6.7.7.3). The data for the correlation with success and diplom show strong positive values in the listed respective HEIs.

6.7.7.3 *ME: International students with HEI*

Correlations

		Success	Erlangen	TU Darmstadt	KiT	U Stuttgart	TUM
Success	Pearson Correlation	1	,821**	,658*	,846**	,894**	,863**
	Sig. (2-tailed)		0,002	0,039	0,000	0,000	0,000
	N	15	11	10	14	14	14

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Source: FDZ – Own illustration

Moving onto Economics: in table 6.7.7.4 success and different regions are analysed showing different associations. The US, Europe and Asia all show strong positive relationship where r = ,976 r = , 971, r = ,857 respectively. Africa's situation is difficult with a weak negative value where r = -,283 but is not significant. There are differences in the success rates and the respective universities, for example, UM with r = ,865. Regarding the countries, the countries listed were those with the most frequented or the highest presence in the exam. They include Bulgaria, then the Russian Federation and China all three showing strong values.

6.7.7.4 *Econ: International student, region, HEI*

Economics											
		Success	**Africa**	**Europe**	**Asia**	**USA**	**Turkey**	**France**	**Bulgaria**	**Russia**	**China**
Success	Pearson Correlation		-0,283	,971**	,867**	,976*	-0,266	0,323	,897**	,886*	,861**
	Sig. (2-tailed)		0,717	0,000	0,000	0,024	0,610	0,479	0,000	0,019	0,000
	N	22	4	19	14	4	6	7	18	6	15
		Success	**UM**	**Berlin**	**Paderborn**	**Trier**	**Magdeburg**	**Freiburg**	**Essen**		
Success	Pearson Correlation	1	,865**	,626*	,999**	,902**	,646**	,750**	,784**		
	Sig. (2-tailed)		0,000	0,017	0,001	0,000	0,002	0,001	0,000		
	N	22	20	14	4	12	20	17	18		

Source: FDZ – Own illustration

6.8 **Interim Summary**

This chapter presented international students' success rates in Germany's HEIs in three different fields of study mechanical engineering, electrical engineering, and economics. The chapter showed the better success rates of international students in different fields. It also showed that the international students had better success rates in the synthetic variable, however, these rates were better than their bachelor success rates. It focused on universities and technical universities because of the greater absolute number of international students in these institutions and in these fields. The work also presented the diplom and bachelor continuation rates, in mechanical engineering and economics before presenting the synthetic success rates for GG and FF- students in the respective subchapters and their different fields of study.

In mechanical engineering, the success rates showed that the international students contribute to better success rates than the GG-students. In electrical engineering, the success rates are, overall, slightly better for the international students than the GG-students. For economics, the success rates are better for the GG-students than the FF-students.

The chapter also presented the FG-students, which do show an improvement over time, but that their success rates are comparably worse than that of the GG-or FF-students.

The chapter continued by specifically comparing results between the international students according to region. The chapter also presented the pass/fail in the three fields of study according to the region of the international students, which showed the difference between the engineering fields and economics, and in particular the higher rate of failed exams in economics for the African students.

Due to the particular high failure rate, the chapter also chose to review African countries with the highest number of sending students, before comparing the success rate of the international students according to the regions. In this particular analysis mechanical engineering showed the biggest difference between the international students from the different regions. The analysis continued with some correlations, and for the international students the results only showed weak or moderate correlation values for success and diplom, but the results did not show any significance for the FF-students in any of the fields of study. The next chapter will discuss the results.

7 Discussion of the results

The following paragraphs are for discussing the results so far. The paragraphs will home in on the following aspects of this work on international students' success rates in Germany's HEIs:

- the relevance of the results
- revisiting the research questions and answers
- internationalisation in Germany's HEIs
- international students' success rates
- what we can learn from using official data for measuring student success rates
- the relevance of the regular study time
- the limitations of the work.

Before moving on to the relevance of the results, here is a short recap of the aim of this work (chapter three): the work, in general, sought to find out what the international students' success rates in Germany's HEIs are. The three hypotheses that the work set out to analyse included:

- the success rates of the group of international students are less than the success rates of the German students
- the success rates improved with time
- the success rates are better in the bachelor than in the diplom programmes.

7.1.1 The relevance of the results

Recent work researched international students' success in countries other than Germany, such as the US, and indicated that international students could potentially contribute to better success rates in the HEIs than has been previously thought (Kercher 2018). The literature also provided research that showed diversity in approaches to internationalisation and international students, on a global and national level (Mazzarol and Soutar 2002). Furthermore, the literature also showed that there is a recognised difference in the type of study field – that mechanical engineers are a particular type of student and that their behaviour prior to dropping out is related to that particular field of study (Ohland et al 2008).

The results of this work showed that international students in mechanical engineering in a large sample of Germany's institutes provide for good success rates in the HEIs. Moreover, some of the rates presented the international students, and their even better success rates than those of the GG- students. On the other hand, for electrical engineering and economics, the results are more varied and show comparable success rates of international students to those of their German colleagues. Therefore, the generalisation that international students' success rates are poorer than German students' success rates can, on the whole, indeed be negated.

On a separate note, but not to be ignored is that the continued comparatively poorer success rates of the FG-students, which is not limited to one field of study or one cohort, appears to be at least not disimproving with the introduction of the bachelor's degrees, which substantiates the works of Avers (2017). This means that with time and through the introduction of the bachelor the success rates of this particular group of students have not disimproved. Yet this work cannot produce conclusive results that there is an improvement amongst this group in the bachelor. Therefore, neither for this group does the second hypothesis hold true.

The results from the data also showed that the diplom has continually attracted students and that the movement from diplom to bachelor was by no means clear cut. By using the synthetic variable and the percentage of those that succeeded, the results of this research showed that students succeed in the bachelor and the diplom and that the international students' success rates are in part better in the diplom than in the bachelor. So, the work can surmise that for the international students, the first hypothesis does not hold: in general, the German students do not produce better success rates than the international students. The second hypothesis did not hold, because the success rates did not improve with time. Finally, the third hypothesis did not hold, because it could not be proven that the bachelor produced better success rates than the diplom.

So, what is the relevance of this revelation? This entails addressing a number of issues, for a start the discussion will deal with a) the actual results and the b) the approach.

First, the actual results: Universities switched to the bachelor for various reasons and with various methods and covering varying timespans. Both bachelor and diplom have shown a stronghold and attract, what this author argues, their own type of student. There has been an overall increase in the number of German students and the number of international students registering in the fields of study presented in chapter six. The destinations for the international students varied. The international students' varied success rates also vary within one region (Munich) and between the regions. Some of the variances may be explained due to regional differences and regional factors. It must be taken into consideration that long-standing international cooperation programmes, such as that of KIT, which will be discussed further in

this chapter, and exchanges with other stakeholders and industries, are factors that play a role in the international student being attracted to an HEI and contributing to creating international processes in the respective HEIs. These processes are support mechanisms that contribute to the international students' ability to succeed

This is relevant because it also shows how institutions need to be able to be flexible in their decisions because these decisions accommodate for different needs- be it fiscal, regional, social or otherwise. The results therefore also showed the importance of the HEIs autonomy in providing for the programmes they deemed best suited to their institution. The relevance of the results goes beyond that, the results showed that the older qualification form, namely the diplom, was also appealing to internationals as a qualification, not just before the bachelor started, but also after the bachelor started, the diplom maintained its attractive power and the ability for its international students to succeed.

Yet the data showed that the bachelor attracted many internationals to come to Germany. This can be interpreted on many different levels. The bachelor was meant to serve and provide for increased mobility. That it did, by attracting international students to Germany to study for a qualification that is mutually recognised in the signatory states. Therefore, the bachelor may also have functioned for some as a door opener to the German higher education system, once they were settled in the bachelor, they found that the diplom qualification was more attractive to them than the bachelor qualification. It is a strong surmise to make but this reflects the DAADs results, as mentioned earlier, about the high percentage of international students that do come to Germany and then decide to stay. The connection is that for the international students that want to come to Germany and stay in Germany after qualifying, integration may have seemed more effective by switching to the German diplom. This is possibly a process that happened during the course of their studies. The motivation to achieve the diplom may be different to the motivation to achieve the bachelor, because the purpose of the degree is different. The motivation to stay in Germany fuels the student to achieve the diplom *if* the international student perceives the diplom as the route to greater / deeper or more successful integration. This is one possible explanation; however, it needs to be backed by future research on the choices made by international students, and understanding the different international student types, and how this influences their motivation to succeed in the respective programmes. Therefore, the relevance of the research is that the higher success rates in the

diplom are an outcome that is relevant for HEIs to know about when considering reinstating the diplom programme[140].

Moreover, the relevance is that HEIs need to consider what the students actually want, or understand what international students want when they come to Germany, and *why* they come to Germany, what is it that motivates them in their choices? In the previous paragraphs, the data produced better synthetic success rates than bachelor success rates. Nevertheless, the provision of the bachelor was thought to be in the interest of the internationalisation process and all international students. The bachelor programme has made studying possible for many, but success rates amongst international students remains an issue. This is de Witt's argument: the higher educational system misconceives what internationalisation actually is (2011). This misconception can lead to a misunderstanding about what the needs or wishes of international students are. A correct conceptualisation of the international student would then facilitate the creation of policies that would further support the improvement of the international students' success rates because the provision of courses meant to meet the needs of societal demands could be in the preferred form or structure that attracts different types of international students.

However, in this work and over this work's temporal analysis the transition phase shows recognition for both degree types and movement amongst and between them. If the diplom were less important, then the students would not switch from a bachelor to the diplom. Like the field of study, which attracts different types of students, do the degrees – diplom or bachelor - attract different types of international students? The purpose of the qualification may differ for the students' goal – be it to stay and be integrated and accepted in Germany or to move within the global labour market.

The continued growth in the numbers of students in the different fields of study presented the possibility that the internationalisation of a bachelor programme was aided through greater interaction with other non-German institutes of higher education. This provided for a positive impact that attracted (ambitious) international students[141] and established a (new) destination, in particular, for academic staff seeking to work in Germany.

Although the data does not measure motivation levels, the success rates must reflect the mutual ability of the students and the HEIs to cultivate the motivation. Students that were

[140] At the time of writing there are several diplom courses offered for mechanical engineering – TU Dresden, TU Chemnitz, TU Illmenau TU Freiburg TU Kaiserslautern amongst others (StudiesOnline, 2019)

[141] Two of the HEIs with better success rates in mechanical engineering (Grözinger McGrory 2020) were in the sampled HEIs, and have been aware the title European University, an achievement which is ascertained with strong European cooperation (EC, 2020), and indicative of "excellence", making its attendance a plus for any graduates CV.

attracted to come to Germany and chose to live and study in a different culture must have been motivated. The literature, theory and data provided for proof that the international students' success rates are not worse than the German students' success rates. Also, the work could address how time and success rates developed, and finally that there were differences in the success rates of the bachelor and the diplom. These will be more deeply discussed in the next paragraphs.

Second, the relevance of the research is the approach taken. This work used the German student statistics and examination statistics, and analysed student success, rather than dropout, and chose to analyse the synthetic rates rather than the individual different degree rates. Only through taking this approach could its relevance be discovered and aimed at understanding that the lower success rates of the international students in the bachelor is a product of an isolated analysis. The relevance of the approach also allowed this work to deal with the research questions. The following paragraphs will discuss the research questions from chapter one.

7.1.2 The research questions and answers

The work set out to answer further questions, including *what are the success rates of international students in Germany's HEIs?* First, this work will present the success rates of the whole sample for the sake of gaining a general overview, before addressing the individual fields of study.

This work used the official statistics and with the data could answer that the overall synthetic success rates of international students in all of the groups analysed were 49% (median 45%). The comparable rates for the GG-students were 43% (median 42%). That means that the success rates for the international students are greater than those for the German students. It also reflects that roughly one-half of the international students succeed in their degrees, according to the given definition of success, and using the fields of study that were chosen. We know that the rates vary from HEI to HEI, and from field to field, and also according to the region where the students come from.

The work set out to answer *how do the success rates of the international students compare to the German students specifically in the following fields of study: mechanical engineering, electrical engineering, and economics*? These answers were relayed in chapter six, which presented the success rates in the fields of studies over the period of the thirteen cohorts. The answers showed that using the synthetic variable the international students' success rates

in mechanical engineering, in the sample shown are more than just comparable to the group of German students. In fact, the international students produced better success rates and if we look at just the group of HEIs and average those success rates then the international students had a mean over the 13 cohorts of M = 59,7 % in comparison to the GG-students average of M = 41,5%. The median values for the two groups were Mdn = 54% for the FF-students and Mdn = 40% for the GG-students.

In electrical engineering the average overall success rates in the same model with the six-semester bachelor and 10-semester diplom in the group of universities and technical university HEIs showed that the mean for the international students was M = 43,7% success rates over the thirteen cohorts which was marginally better that the mean of M = 40,4 % success rates of the German students' success rates. The respective median here was Mdn = 44% for the FF-students and Mdn = 41% for the GG-students.

The average results for the Economics student in the HEIs synthetic variable showed that the German students come out producing stronger success rates than the international students with M = 47,6 % to M = 43,3% and the median values here were (GG) Mdn = 47% and (FF) Mdn = 44%[142].

Both engineering groups' international students provided for stronger success rates than the German students, but in economics, the GG-students provided for stronger success rates than the FF-students.

Analysing all three fields of study, the results show that there is only a marginal difference in the engineering rates, but the order of the rates remain the same: International students contribute to better success rates than the German students. There are a number of possible factors that can be discussed and offered as an explanation. One particular issue is that the fields of studies have their own particularities. The particularities of the engineering fields are, or can be surmised, a factor in the difference. In the literature, it was mentioned that in such fields of study the emphasis in the early semester is on passing the exams and being a part of the success rates.

The literature also suggested that in the first semesters the interaction is comparatively low because the students do not have time to engage in social interaction and must focus on the curricular in order to succeed. Where that is the case that means that social interaction in the early semesters is not necessarily a factor that contributes to international students' success, this substantiates in part what Tinto (2012) argued that motivation can be more relevant than

[142] In this average there are eleven as opposed to thirteen, the missing cohorts two and twelve were excluded for reasons of consistency.

integration when considering factors that influence student success rates. However, where integration contributes, then in applying Tinto's theory of integration from the perspective of departure in accordance with Durkheim's theory of suicide, the loneliness that can lead to departure through lack of integration or belongingness with the native students can be compensated through the integration with other international students.

Although linguistical factors were not in the data, the literature review presented that the language proficiency of the different international students is less of an inhibiting factor than with native students. Social interaction and academic recognition can be achieved by the international students interacting with each other. Furthermore, their interaction with each other is supported by their use of common services, pending what is available in the form of academic structures and support services. These services facilitate not just the academic and cultural acclimatization but contribute to the confidence-building which can promote classroom integration (Thi 2008). This argument is supported by the literature arguing that the one aspect that international students found challenging about their study process was the lack of interaction with the natives, where they experienced varying degrees of loneliness, isolation, and discrimination (Araujo 2011, Ardrade 2006, Constantine et al 2005, Hechanova-Alampay et al 2002, Thi 2008). Therefore, the motivated international student may have difficulties integrating with the natives, but this is countered by their motivation to succeed and/ or their integration amongst other international students.

Another possible explanation for the better success rates of the international students is their choice of purpose. Having both diplom and bachelor gave international students an option to choose the model that best suited their goals and intentions, if we consider that the diplom was less likely to be offered in English than the bachelor, this further provides discursive structures that accommodate the different types of international students. What cannot be answered here, but discussed, is that if the international students moved from bachelor to the diplom, what role does their choice of degree type play in whether or not they want to master the German language? Do international students come and test the waters in the bachelor that was offered in German and then move to a diplom that is also through the German language because they wish to continue to live in Germany after they have graduated?

The work further sought to investigate if the international students need longer t*han the German students to complete their degrees.* The work discovered that the international students do need longer to complete their respective degrees than the German students. This is very evident in the field of study mechanical engineering. The bachelor and diplom analysis in the different fields of study provided results and these results showed that for the 10-semester

diplom the average time needed over all the cohorts for the GG-students is M = 12,2 semesters, for the international students the average of their diplom in duration of semesters is M = 12,5. For the FG students the average duration exceeds M = 13 semesters. [143] In the ME university and technical university sample, an analysis of those HEIs in our sample reviewed the groups of GG and FF students and these respective groups duration in the diplom and the results were not significant.

The work also sought to answer if *the bachelor facilitates better success rates than the diplom in a particular field of study*. From the descriptive data based on the given sample the answer to this is no, that the bachelor does not contribute to better success rates for the international students. However, by further exploring and having analysed the data, the results showed that for the group FG-students, that the bachelor does contribute to an improvement in this groups' success rates[144]. However, considering that this very groups' success rates were so weak, anything other than an improvement would be nothing other than an outcry of utter policy failure- whether the policy failure lies in lack of transparency, poor communication on both sides, or the need for a different selection process is beyond the data.

The author further sought to identify if *the international students' regions of origin present different success rates.* In the sample shown differences emerged. In chapter six a comparison of only the international regions could show that there are some regions, that positively contribute to the success rates. Although this work concludes that the role of country of origin is not completely negligible, and this can help in the provision of support for students from regions that are faced with extra challenges in adapting to the educational culture, which can impact on their ability to contribute to the success rates. The impact of regions was visible in the duration of time needed, and also the percentage of students that passed the different exams, in both cases: duration and percentage passing the exams, the Africans trailed behind the Asians and the Europeans.

Much has been done in previous years, through the introduction of support networks in the form of study buddy, or campus angels[145]. But further infrastructural support aiming at international students focusing on those from regions, would serve to improve exchange opportunities between the German students' learning culture with the international students. However, the question is if these outreach mechanisms, reach the students that need support.

[143] Some cohorts where the numbers were not released so the average that is given is based on the data released, as were the BA and economics students due to restricted data access.
[144] Reference from chapter seven.
[145] Both programmes are in existence at the EUF and are successful in finding a path of communication with the new students.

The focus and attention are on student success and theoretically one would hope that there is an improvement: an improvement with time should facilitate improved student success rates. With the bachelor supposed to be replacing the diplom there is a progression in time – so the newer datasets and more recent datasets have more bachelor cases than diplom cases. The thought was that the Bologna Process was set up to facilitate access to higher education, reduce the amount of time needed to study, and facilitate the mobility of the students within the Bologna signatory countries. The idea would also be that with the progression of time, there are more students, and also an increase in success rates. Again, HEIs will want to improve the situation so that there is less of a miss-match or remove factors that inhibit student success. So, did *international students' success rates improve with time*? Funnily enough, the answer, based on the data presented in chapter six can conclude that for the mechanical engineering sample of international students' success rates, is no, the rates do not improve with time. The implications for this are not necessarily as negative as we might first think. What can be seen is that there were comparable success rates in the diplom in mechanical engineering. So perhaps if HEIs look and see what was happening with the international students in the diplom and use that as a mechanism to understand what they can do to improve the situation for the bachelor.

It must be borne in mind that the failed improvement in the success rates becomes more evident through analysing the data with the synthetic variable because the analysis is overarching and between the two programmes, and as such the students were finding the best solution for them to succeed. Perhaps that is the way forward: to acknowledge that both forms provided for different types of students, and both forms were alluring for the labour market, in particular for mechanical engineering. Would it be so much more cost intensive to offer both diplom and bachelor programmes? Or to structure the bachelor along the lines of the diplom? But would this contradict everything that HEIs have done and are doing to improve on their internationalisation?

7.1.3 Internationalisation in Germany's HEIs – degree type

A 2018 report in Der Spiegel (Dreyer 2018), highlighted the reintroduction of the Diplom, and showed that the older higher education format and qualification is not dead and gone. However, how does this impact on the attempts at internationalisation? Internationalisation is not harmonisation. By measuring the success rates of the bachelor and the diplom greater success rates in the diplom in mechanical engineering were visible, but there was movement in both directions in all three of the fields of study, and by all of the groups' GG-, fg, and FF-students. By using the synchronised variable, the results showed that both the diplom and the

bachelor have the potential to create good success rates for the international students. This demands discussing what internationalisation actually means. For an international student that achieves a foreign qualification, the diplom is the international education. It differs from that in its home country.

This substantiates what de Witt (2011) said about a misunderstanding of internationalisation and what it actually is. In this case, it could be argued that the international students' success rates in the diplom show that the diplom is then internationalised through the international students that chose to switch to the diplom. This produces qualified labour. The international diplom graduates have been educated in Germany and may well emigrate with their qualification back to their country of origin or elsewhere. These international students may choose to remain in Germany and their presence is a source of internationalisation beyond their higher education and the process of their qualification. Either way, the international student being educated in Germany is a step forward toward different types of internationalisations, and most definitely fulfilling the aims of the EHEA. Therefore, the diplom provided a different type of internationalisation.

Through the bachelor, the international students that contribute to the success rates provide for the long haul of internationalisation at home, as the international students come to study, qualify and then either remain in Germany or move on to pastures new. Either way, this is internationalisation for all those that engage with these international students, and with a successful qualification, it increases and develops the internationalisation structures in our systems – albeit on a social level, through employment or further education.

Internationalisation per se was and is the intention to also increase the presence of international students in Germany's HEIs and theoretically have them equally capable of succeeding as any other group. Within this group of international students are many subgroups that can be analysed, one such subgroup in this research included the country-based group. In earlier chapters the strong numbers of particular countries, and also their increased immatriculations were parallel to the introduction of the bachelor. As mentioned, the stronghold of some countries, if we take one of the countries included in the analysis, such as Bulgaria, it needs further explanations beyond the official statistical data. Bulgarian HEIs have excessive availability of student places for particular study programmes and fields of study. One such field is economics, where supply exceeds demand and also that this is leading to a mismatch in qualifications[146]. This could imply that students seek to attain their qualification abroad so as

[146] This was the topic of a Master's thesis that was supervised in the European Studies programmes at the EUF.

to distinguish their qualification from that of their national student colleagues, and as such increasing their social capital (Porter 2010).

So, the internationalisation of Germany's HEIs facilitates international students in attaining a qualification that differentiates their qualified status from that of their co-patriots that have received a domestic qualification. The motivation to achieve with a difference is relevant because it adds to the reasons why international students choose to study in Germany, and that difference may be furthered through the variety of languages through which the programme is offered. Furthermore, this adds to the theoretical explanation as to why the international students as a group can achieve better success rates than the German students as a group.

In the literature review, the work presented some of Vincent Tinto's works on integration being quintessential to student success. Tinto's theories on integration can be traced back to the works of Durkheim, which were also used in the literature review. Here the role of the success rates reflects a successful process of decoupling, a concept that is not new to higher education (Hüther and Krücken 2016). The international student may be able to integrate with other international students through English, for example, and quite quickly, therefore speeding up the process of decoupling from their home culture and creating a structure where integration becomes a part of their educational process. This could explain the success rates of the international students despite their lack of interaction with the native students: so, in the process of decoupling it has created a platform which has occurred, and interaction was possible. Both of which are – interaction and decoupling - factors that were presented in the literature review as important because the new commonality is not with the native but with the other like-international students and through which their integration creates a strengthening of their proficiency in the language of instruction, and also increases their cultural capital, and communication skills. All of these factors contribute to supporting the creation of a process that supports the environment for student success.

7.1.4 International students' success rates and double degrees: The case of KiT

There are a number of issues that emerged in the data (see also 3.1). One aspect that can be discussed is that of geographical "proximity" (OECD 2019 p.237) to foreign borders, and whether that has an influence on increasing numbers of international students over the course of an undergraduate degree, and likewise how this might influence potential decreasing numbers of GG-students. This emerged during the analysis but was beyond the scope of the data due to limitations on the location of the international students' native higher education

institutes. However, some HEIs have cooperation programmes, and some of these HEIs are close to borders.

One of the HEIs in the sample that is close to a border and has a double degree is KiT. Specifically, in the sample, this work presented that double degrees are relevant because it fosters a strong sense of networking with international industries, as in the case of KiT, whereby KiT offers a double degree with multiple universities[147]. In general, the double degree may require registration in both institutions until completion or exmatriculation. In such a case the double degree may contribute to what this author calls success inflation, which will now be explained. If the HEI has an increasing or unnatural development in the number of students in senior semesters, this, in turn, leads to a higher number of double-degree students completing their exams: then the success rates are inflated. In order to examine this, only closer and particular analysis of the data could ensure that the cases are not inflationary.

Hence, the KiT case study. Since 1989 the universities have been cooperating across borders to maximise their potential in providing for and developing in the region. The cooperation programme includes Strasburg, Basel, Freiburg[148], Karlsruhe and a number of other French universities offering this double degree.

Other German universities apart from KiT are involved in the double-degree package but KiT seems to attract those foreign students in their senior semesters. In the previous chapter, the data presented the percentage of examinations that are by international students. The analysis included HEIs, one of which was KiT, and its international students' examinations rate by far exceeded the other sampled HEIs peaking and then declining again in more recent years. Furthermore, the KiT case study showed the regional relevance of other stakeholders. The case discovered that the regional development programme (Eucor)[149] , of which KiT is a part, is quite comprehensive, in that the web pages by no means limit their engagement to academia, the work precludes a comprehensive investment in the local environment on a political, social, economic, civic, and educational spectrum. The potential for employment for the international students, through interaction with local companies, must increase the motivation for international students to qualify from KiT.

The implications of such go beyond a degree course that facilitates the international students in achieving the German qualification. The practical implication reflects the aims of the EHEA by creating an environment that facilitates international students to stay in Germany

[147] http://www.defi.kit.edu/241.php
[148] See appendix with map
[149] Eucor is also one of the 17 Alliances that was accepted in 2019 as part of the European University concept (EHEA 2020).

after qualifying. In turn this means analysing the overall population of a region, as was presented in chapter three. To substantiate the case study results, the author also used regional data (Inkar[150]), to analyse the overall demography of the region, because this data provides not just the students but all persons living in the region. By using this data then the author could identify that in Karlsruhe the percentage of "foreign" students residing there from 1998 through to 2015 rose from just over 12% to a maximum of 17,8% in 2004 and fluctuates since then between 16 and 17%. It could be speculated that this comprehensive all-rounded engagement is what attracts the international students and encourages them to attend the German KiT courses in their more senior semesters, with the anticipation of attaining final qualifications in the German districts. Whereby the international students' positive success rates go beyond the HEI and become a part of the process of internationalising the region.

In such cases as Eucor, this process, from the theoretical perspective contributes to supporting a structure. The structure also reinforces that the systems function and work in favour of the international students. The potential to succeed can act as a motivating factor for the international student because the consequences of success also contribute to increasing their cultural capital.

However, in the case of KiT, the breakdown of student places raises some questions: whereby, in certain cases, only 5% of the student places are for international students, the number of international students that are, in this case, given access to studying in Germany is higher than the assumed rate allowed (Hochschulstart 2021). However, the limited rates are relevant for those HEIs that set particular conditions or NCs for entry. Rates for entrance according to the region of origin are supposed to reduce the problems faced by housing and facilitate local students from maintaining their "lives" in the region and not being uprooted and having to study elsewhere because there simply were not enough places in their local, HE provider. However, perhaps this rate is not an issue if students enter in their more senior semesters.

The double degree hence leads to the question would the success rates for the international students in mechanical engineering be as good if KiT were removed from the sample? In order to address this issue, the author sought to present the data on an individual HEI level, by using the three youngest cohorts 11, 12 and 13. Taking the last three cohorts of the sample data (Cohort 11, 12 and 13) the author created the graph with success rates, and of

[150] The INKAR data are the Bundesinstitut für Bau-, Stadt- und Raumforschung/ Federal Institute for Building, Town and Spatial Research and provide data on regional employment amongst other aspects, and in this particular case to the percentage of the population that are students residing in the region.

the seven HEIs, only two of the HEIs German students produced stronger success rates than the international students.

Therefore, the role of this particular double degree is not the factor that isolates KiT's success rates. Discussing the role of double degrees as a reason for the better success rates also means reflecting on the consequences for the international students, a sought-after source of labour, and how stakeholders such as Eucor's have multiple positive impacts, such as its ability to be recognised as one of the EU's European University's, an initiative that recognises the embodiment of the EHEA's aims, and the ongoing need for bottom-up internationalisation processes. These bottom-up structures are potentially the ones that contribute to the international students' success rates. Nonetheless, double degrees can distort the success rates where registration is restricted to examination and not the international students' first semester.

7.1.5 Lower success rates: The case of the FG-Students

The migrant German (Bildungsinländer) that were depicted in the previous chapters, as a group, are confronted with a number of issues: the, on average, longer duration needed for completion of their degree, and their lower success rates.

For the migrant German, the longer duration needed for the completion of higher education could also be related to the hours that the student may have to work in order to get through their tertiary education, therefore, their lack of social capital and financial capital impedes their ability to succeed. This could explain why the FG-students needed longer than both the GG-students and the FF-students to complete their course of studies. Furthermore, their longer study time means that they are in general not available for full-time employment for a longer period of time. Although they have the opportunity to take longer to qualify, exactly this taking longer is arguably a factor that means they are no longer a part of a study cohort, and this isolation toward the end of a study programme, is rarely a factor that induces success. However, it was amongst this group of students that the standard deviation dispersion was greatest around the mean duration of time needed for completion. Therefore, the success rates for this group indicate that the group is fraught with unaddressed complexities and enriched with potential untapped diversity.

The literature review also showed that hurdles based on the migratory background are an issue in NRW. The Mercator Report (Ebert and Heublein 2017) indicated that migrant students tend to overestimate their own linguistical ability. By using the official data and including the report by Aver (2017) this work argues that there is a deficit in reciprocal obligations. The institutions need to observe developments in the demography of their students.

It can be further argued that this remains a hurdle for all 16 federal states in Germany. By using the synchronised variable, however, the work highlighted how critical this issue is. By only focusing on the bachelor the disastrous success rates of the international students paled the relevance of the weak success rates of the FG-students. With the synchronised variable, it can be further argued that international students are by no means the only issue of concern. The FG-students' success rates were similar in both the synchronised and bachelor rates, showing that the bachelor at least seemed to be more accommodating for the FG-students, however, their success rates imply that there is a lot that needs to be worked on before the process can be considered as one that provides for equality of opportunity in higher education for all those who embark on this process. This means all institutional structures need to be taken into consideration (Aver 2017).

7.1.6 What we can learn from using official data for measuring student success rates

The official statistics provide an array of information through variables where the data is gathered in over 400 institutions throughout Germany. In his work, the data provided for various possibilities, also in measuring success rates of HEIs or fields of study (Bandorski et al 2019b, Beck 2007, Grözinger McGrory 2020, McGrory 2020). The data also allowed for the measurement of the success rates of groups of students, of fields of study, of regions, according to the type of degree and many more aspects are potentially possible. This means the source of data provides for the measurement of success rates, retention and in future analysis, with the release of the new structured master questionnaire in 2017, provides information on the second language of a student, and the ECTs that a student has ascertained. The official statistics have allowed for an analysis of the structural developments within the German HEI system and how the different HEIs reacted to and acted upon the implementation of the Bologna Declaration, and how this international agreement has steered the overarching agreement to gain internationalisation.

The official statistics also showed the differences in capabilities of the international students from the different regions, the time they needed to complete, but that the excessive time needed is not alone related to the grouping of being GG-students or FF-students.

As of 2017 official statistics datasets[151], with new variables being made available, the issue of student success can be readdressed, and the types of degrees in conjunction with the

[151] 2017 data is only available, at the earliest 2019.

ECTs gathered. Plus, the extra variables about the languages of the students bring the FG-student group better into focus and allow for a better analysis of what deficits exist in our HEI policies, and how they could potentially be addressed – this means focussing on both the institutional development and the different types of students in our HEI systems are possible. This extra information is a step toward recognition of the needs of students in the data. In concrete terms, this also should mean that it is a step toward recognising the importance of true-cohort analysis in analysing our institutions and what type of education they provide. This is about understanding our institutions and how to improve the systems of which we are a part.

7.1.7 Why debunking the misconception of international students success rates with an empirical analysis using administrative data must be a process

It is pertinent to measure student success rates in general, and that of international student success rates in Germany in particular, also because the international students are potentially Germany's future labour force. By measuring the success rates this allows all stakeholders to assess their role and where there is room for improvement. Through providing a low-cost higher education Germany provides for the development of its labour market with the potential of reducing further divergences that increase inequality amongst its people. By allowing for human capital to develop across all parties of and in its society and allowing for these to also either stay and invest in the local community or also by returning or travelling on elsewhere, Germany is making a contribution to the global labour market and reducing further inequalities within the respective societies. This may be a venture, but by nothing ventured there can be nothing gained.

The implications of facilitating different international students to study and succeed in their field of choice is also much broader than merely being a supplement to the labour market. The implications of which can go beyond reducing the cumbersome gender gaps and discrimination that still exist in our societies. The importance of identifying the demographical makeup of international students and their ability to contribute to the success rates means the rates can contribute to identifying if international students take subject options that may not have been feasible in their country of origin[152]. By providing courses for international students Germany is also contributing toward the "human capital century" (Goldin 2014 p.5). Increased education for all reduces intolerance (Bok 2017).

[152] One example is the case of Pakistan, where access to education for females is not only a case of affording it, but that education may not be available (HRW, 2018).

The shift in political power is also reflected through the shift in international students away from the US. That is not to say that the international students' success in Germany is reflective of Germany as a hegemony, but the geographical pivotal points are moving, and the international student will want to succeed. Feeders such as China and African countries will experience a shift if there is a change toward the greater provision of courses at home, and this means that there are possible changes that will accommodate more students. This will change the movement of potential international students, which is a precursor of labour market movements (King 2012) and is reflective of the presence of human capital. So where will the next epicentres be?

At the time of writing, there are 429 (Destatis 2020) different HEIs in Germany, and that each institution has a role to play in the societal development and creation of social norms that become embedded in the students and their surroundings. Students' success rates are dependent upon reciprocal obligations – both the HEIs and the students of which the HEIs are a part are responsible for contributing toward their HEIs rates. Tinto (2012) reiterated the importance that academia has in providing students with a challenge and that without this challenge it opens up another reason for students to decide against succeeding in certain programmes for "[n]obody has ever risen to low expectations" (Tinto 2012 p.10). Furthermore, the challenge, in particular, for international students is going somewhere else, the spatially and culturally different environment that provides that extra stimulus which is described as a reason for studying in a foreign environment.

7.1.8 The limitations of the work

There are a number of limitations encountered during the work, in particular regarding the method, the sample, the data, the use of the data and other data. The cross-cohort method provided a reliable and well-tested method (Bandorksi et al 2019a)[153], and the research focused on the three fields of study. Alternatively, with more time, expanding to explore success rates in the humanities would collaborate on the extent of success in a broader number of institutions and with different student mindsets. The official statistics restrictions about the approaches taken and the approaches that are allowed are not always clear cut and
are very limiting (Bandorski et al 2019a).

[153] Further forms of analysis may be carried out by Destatis following the last Higher Education Data Reform; however, this data and the results will be restricted for internal purposes only.

The dataset as it is has limitations because there are pieces of information which could contribute to the analysis, and the explanations – most importantly is the inclusion or rather an exclusion of data saying whether the student is a Bafög recipient – something which would go a long way to understanding what contributes and does not contribute to student success in the higher educational institution in general. The Bafög data, although not necessarily relevant for the international student, would support the comparator, by being applicable for the GG and FG-group of students in Germany. The potential of linking success rates to the percentage of students in a particular cohort that are grant recipients could contribute to identifying exactly what role this plays in student success rates. From this, particular HEIs with high numbers of BaFög recipients could be eligible for grants to support students through their studies. Further limitations of the data are the quality of the data, something which needs improving on.

Using other data, such as final school grade, regional unemployment etc, are data that could contribute to understanding regional factors and how these develop over time. Further limitations are the restrictions concerning the access to the data, which is very limited.

Ultimately the international students' success rates are necessary to address present policies in higher education. If the aim for higher education is "equity" and the ability for many to improve their general situation and reduce inequality in society (Massey et al 2005, Tinto 2012, Shay 2016, Bok 2017, Avers 2017) then the way forward has to address a number of different perspectives:

a) Are low success rates acceptable?
b) Are differences in the success rates in the one field of study but based on nationality acceptable?
c) Are low success rates, if unacceptable considered a joint hurdle for all involved – both institution and the student?
d) What can all parties do to improve the possibility for equality of opportunity to succeed?
e) What can we learn from others?
f) Do we want to know what the HEI rates are?

Much of these questions are answered by answering the last question – in an attempt to learn from others, HEIs want to improve – regardless of whether it is output (Shay 2016) or not. Furthermore, by using the official statistics the HEIs can home in on students from particular regions and establish if support is needed or not. And by using the official statistics the HEIs are then presented with the opportunity to evaluate their own ability of dealing with their own data and use this secondary source of data as a resource to help improve the situation for all.

8 Conclusion

This work analysed whether the international students' success rates were comparable with the German student success rates in Germany's HEIs. It focussed on mechanical engineering, electrical engineering, and economics as fields of study. Furthermore, the work set out to combine both the diplom and bachelor in a synchronised variable in order to address the issue of the field of studies at a time of structural upheaval through the Bologna Process within the German higher education system. All of this was possible by using the administrative data.

The administrative data portrayed structural change (Teichler 2007) and societal developments. By using this expansive data this work was able to analyse all students that were registered from 1995 up to 2015, and all examinations are taken from 1996 up to 2015. The cross-cohort analysis provided a stable and well-tested method of analysis (Bandorski et al 2019b) and with its 13 cohorts avoided the limitations that can lead to a misinterpretation through just a singular cohort analysis. The official statistics provided an ample base and sufficient data to carry out the cross-cohort analysis of the success rates. It is a sustainable form of research because the work used data that, which feeds from all of Germany's HEIs, which have a common master questionnaire that is used to record and store the information. The data supplied information about the HEI, the type of exam that the student sat when the student sat that exam and how many semesters the student was registered for at the time of the examination or at the time of registration. Further information including the country of origin and the place where the student received the right to matriculate were also in the datasets.

The student datasets provided information about their semester at the time of reporting, from which the data could read if they were first semesters or were still registered as students beyond the number of semesters assigned to this work's definition of successful completion of either of the degrees. Moreover, the model that was created and used in this work incorporated both the bachelor and diplom and analysed the types of qualifications and attraction of subjects, and not just at a snapshot in time. The work also delved into a vast array of literature to support the arguments and the results.

In the literature, different approaches reviewed issues concerning international students and their success rates from an international, theoretical, methodological, historical, and national perspective (Hüther and Krücken 2016). Tinto's (2012) theory of integration and migration systems theory (Mabogunje 1970) were used to help set the framework for further research. This provided a background for analysing the international students' contribution to

the success rates of the HEI, because their ability and motivation to decouple and integrate into a new setting provide proof of the result of what must be their motivation as choice immigrants.

While the work set out to understand international students' success rates in Germany's HEIs, through the literature it encountered possible complications and factors that may contribute to understanding the hurdles facing different types of students. These two theoretical approaches, Tinto's work on integration, and the spatial factors by Mabgunje were chosen to support the works analyses, methods and discussion in explaining the international students' success rates. Moreover, Parson and Smelser's (2010) contribution to structural changes in the respective systems substantiated how analysing the structural systems can help explain that they are comparable, and why the success rates of international students are comparable to those of the German students. The complexity of migration is manifold, which was reflected through King (2012) in terms of differences and definitions, and this is where the official data records are of benefit, for they allow for parameters to be set. The increasing complexity of understanding international students' success rates with the help of this administrative dataset highlights the complexities that may exist, and what solutions can be sought in order to increase the potential of each student and the HEI to thus meet the needs of society.

The work leaned heavily on international research where there is a greater focus on student success and retention rates and types of retention in comparison to the German literature that rests heavily on the work of the DZHW (Grözinger and McGrory 2020) and student dropout. To delineate the approach and method, this work created a definitive tool to measure international student success rates, which was also based upon the understanding that students in Germany's HEIs do not necessarily complete their programmes in the officially recommended time.

Hence, success was defined as completion of a programme within a total of 14 semesters for the 10-semester diplom or 10 semesters for the six-semester bachelor. With a common finishing point, the work compared the completion rates. The starting points were fixed, whereby the starting point of the diplom and the bachelor were staggered. Furthermore, retention rates using the data looked at the movement of the groups from their first semester to the third semester in the programmes. All the results substantiated the use of the official data for the analysis of students' success rates including groups that are not just of German origin. The results of the analytical tool also proved that the duration needed exceeds the duration of time assigned.

In the course of the research further results emerged that could not be ignored, these concerned the Bildungsinländer, that is those non-German students that received their right to

matriculate in Germany. This research showed that the FG-student group are those that demand more/ the most semesters to complete their programmes, over and beyond that of either the GG- or the FF- group of students. In the course of reviewing the literature, the work encountered research that this group includes sub-groups, and that there are differences amongst and between these groups, and that some of the sub-groups overestimate their linguistical capabilities (Ebert and Heublein 2017).

Differences according to social class and socio-economic background remain inconclusive apart from research that covered the relation of employment hours during the course of the study programmes. The results of the student success rates, comparing the GG-, FG and FF students, conclude that the FG-group are the ones that consistently have the lowest success rates, but with the given administrative data there is absolutely no conclusive evidence that this is because they overestimate their capability. The administrative data provides results that show that this group do not produce success rates that are as good as the GG or FF group. This reflects the works of Avers (2017) on his research of FG-students in North-Rhein-Westphalia. So here the work concludes that the lower success rates of any particular group means that there remains a need to address why this is the case, and what is being done and what else can be done to appease these blatant inequalities, and also to address the reciprocal obligation of both the HEI and the student.

Furthermore, the work analysed the role of the Bologna Process, and how success rates developed in Germany's HEIs. Using the administrative data, facilitated reviewing the development of success rates for the groups in 13 cohorts. These two decades encompassed the introduction, changes and implementation of new structures based on the Bologna Process. The Bologna Process contributed to the creation of the bachelor which should replace the diplom. The results and preferences for one programme or the other could be reviewed by using this data. The results were inconclusive as to whether or not the bachelor was the preferred examination in all of the fields of study amongst the international students. The results were inconclusive that there is movement exclusively from the bachelor into the diplom in the field of study for mechanical engineering for the international students and also for the GG-student group. This can be further substantiated by the reintroduction of diplom programmes in Germany's popular field of study mechanical engineering (Dreyer 2018).

The analysis also covered a period of colossal change in Germany's higher education landscape where the *Excellenz initiative* began, and how this initiative included that internationalisation was a goal, a goal that many HEIs aimed toward to improve their international standing in terms of internationalisation. This goal included third party funding to

support tertiary education in gaining international esteem. The esteem which may attract the international student, and the continued attraction would improve the standing of the HEI. If the reputation of the HEI is important for the international student, and this is why certain HEIs attract international students, then reviewing the relation between increasing international students' success rates and becoming or being an institute of Excellence according to the initiative is important. Therefore, this work concludes that the concept of internationalisation through the success of international students in Germany's HEIs needs to be better understood.

Furthermore, with the literature, the work can challenge conceptualisations of internationalisation: such as Killick's (2012) work that concluded the importance of the internationalisation experience being independent of the place but a product of those with whom the student studies. This somewhat contradicts de Witts's (2011) argument that internationalisation is a mixture of international and native students. In conjunction with the research that presents the difficulties for international students interacting and integrating with the native students then this work concludes that internationalisation of higher education is equally internationalisation if the international students remain amongst themselves and that this form of internationalisation is then successful. This however lends to the understanding of why internationalisation at home remains a challenge.

By identifying such patterns HEIs can learn and possibly apply best practice scenarios. The provision of the success rates also allows HEIs to reflect upon their institution – are the rates ok, or is there room for improvement? How do the rates develop in one institution with one group of students over time? By comparing the different fields of study and by looking at the institutions as an aggregate and individual, the work gained insight into the variability of the results where the international students' success rates provide an alternative to understanding the different approaches needed in the internationalisation of higher education in Germany's HEIs.

From the results, the work concludes that the international students' success rates in mechanical engineering are better than the GG-students. Unfortunately, the FG-students contribute to weaker success rates in the synthetic variables. If, however, the work were only to measure and observe the bachelor programmes the work would have to conclude that the international students provide for weaker success rates than the GG-students. Therefore, this work concludes that there needs to be a greater understanding of the international students' success rates in Germany and the internationalisation of higher education in Germany. Here there appears to be an assumption about what the international student seeks, does the

international student only seek the bachelor's degree? This book can conclude that this is not necessarily the case.

Finally, the work could conclude that the official data can be used to measure international students' success rates. Whilst other methods of researching student success rates are not herewith deemed as less important, the contribution of creating success rate models with existing expansive data is a sustainable way to provide many researchers with a tool that is expansive and is efficient in that the data are there and are there to be used.

9 Recommendations

"[E]xperience tells us that intervention matters".

(Tinto 2012 p.50)

The following suggestions concern the relevance of the international student success rates, which are not solely a concern of higher education. They address issues concerning social capital, human capital, gender equality and federal stakeholders.

The success of the international student is relative to the success of all students that partake in higher education in the institution of which they are a part. The impact of measuring the international students' success rates is not just about the reputation of the HEI but has a deeper routed impact and rippling effect on the whole system of which the rates are a part. Higher education contributes to the creation of various types of capital (Armstrong and Hamilton 2015, Portes 1998), of which social and human capital are types. Human capital is a construct which also asks to what extent the educational system of a country values the different levels of education. By opening up the higher education to non-nationals the potential is manifold, including creating a more expansive and diverse middle class in contemporary capitalist societies, expanding on our cultural and social capital which in turn is thought to facilitate increasing human capital (Bok 2017).

With continued further analysis, the results could be followed, and further actions can be amended or added. Based on the results of this work at the time of writing the following recommendations are being made also in order to support the HEI systems and society in general.

First and foremost, the quality of the data is reliable, but like anything there is room for improvement. The HE providers should receive support in order to put a greater effort into minding their data. That basically means those people who are dealing with the data should be given the time and the resources to invest in their work. Comparability of the data between HEIs might work better if there was a form of cross-referencing. This support could be provided by the federal government. As should increase accessibility to the data, which is restricted to those who can afford both time and access to driving to and paying for the data.

Second, laws including data protection in Germany negated tracing students because it was considered, at the time of writing, as infringing on the privacy of the student. However, the laws have changed but it will be some time before tracing can be enacted. For that point in time, it would be worth readdressing the matriculation number. One matriculation number, that each student receives the first time they have matriculated in Germany should be reviewed. If each

person can have a social insurance number, why can they not have just one matriculation number? A nationwide matriculation number would be the simplest form of recognition – after all, each HEI has its own number. The first two digits the first matriculated federal state, the next two digits their nationality, the next digit their gender, the year of their first matriculation, and thereafter a random number applied, this should then follow the student through. A nationwide matriculation number should contribute to a simplification of the movement of students within Germany. In addition, the data collection should include the number of credit points attained at the time of recording in the student data set and not only in the final examination dataset[154]. This way the administrative data could correctly count the differences in credit points that are attained per HEI, per field of study, and allow for a greater recording and understanding of what society and students perceive to be a success.

Third, transparency about the HEIs internationalisation processes that may contribute to success rates. Internationalisation, per se, regardless of how, should facilitate equal opportunities. One way of promoting different types of internationalisation is with the double degree, as it establishes a framework that makes internationalisation affordable and feasible for many. "There is a certain sense of elitism attached to having academic credentials from universities in different countries, even if the student never studied abroad but benefited from distance education and visiting foreign professors." (Knight 2008 p.11). There is a constant need for promoting double degrees and transparency about reporting the success rates of HEIs with double degrees and how this may spill over within those HEIs. However, the data need improving in order to be more accessible and legible as to the type of double degrees, so that the data is more consistent with starting and finishing the degree in the HEI or HEIs.

Fourth, student success rates are related to the ability of the student to succeed. This also includes making success accessible for all. It does not mean making formal education easier, but it does mean that there are students that try to succeed in our present formal education and find different ways to access the educational process. The onset of SARS-CoV-2 in 2020/21 led to a change in how society copes. A recommendation here is that digital readiness may contribute to making education accessible because it provides for those students who cannot partake in the conformal restrictive methods of learning. The provision of alternative, digital, methods of education provide all different types of students with a form of accessibility that should facilitate success rates due to the diverse accessible methods of access. How this may

[154] In the process of writing, the new 2017SS questionnaire/ codebook was released with the data that we received in 2020 – the exam data have the ects, but the student data are scantly filled with ects.

also impact on future success rates of international, German, and migrant student needs to be recorded and further analysed.

Fifth, the work showed that in many cases the German migrants are the least successful of the groups in achieving their degree. The question is, if reference is made to the literature and the data is analysed, including information about Bafög recipients with the variables of student success, policies could be created or amended so that they could work more efficiently. Identifying this is relevant for both German and migrant students alike, either way it allows for an analysis of those from lower socio-economic backgrounds and for the correlating of what the relationship is between student success and being a Bafög recipient. Because we do not have information about Bafög recipients in our data, the data is limited in producing important information on the needs of students. Information and data about German grants and their recipients need to be made readily available in order to test where the lack of success lies, and the inequality of opportunity persists.

Sixth, what is clear is that the lower success rates amongst migrant Germans mean that the policies that are supposed to exist to ensure that this group of students succeed do not work. HEIs would make the situation more transparent also by presenting their average success rates and the average duration of time for completion needed. Therefore, this recommendation suggests that the HEI can flag longer durations and lowering of success rates per annum. This could be broken down according to national/ international, or even according to the region if the numbers permitted. In doing so the HEIs as a unit, are constantly reflecting on their collective ability to succeed. The previous paragraph (about digital/online courses) could appease some of the difficulties faced by migratory backgrounds, and this has been elaborated on by Bok (2017) by using systems that are applied in primary and secondary schools to highlight or flag possible difficulties (Bok 2017 p.164-168). Here again, the reciprocal obligation is the framework set, where both student and HEI show responsibility for their own progression, flagging difficulties means that the students have to want to be assisted and have to actively work on achievement, and HEIs have to create the structures that make it feasible for students to progress. In order to understand to what extent discrimination plays a role in the poorer success rates, analyses by addressing personal, cultural, or social reasons asks to what extent all three have a negative impact on the students' success rates. For the different success rates are not necessarily a reflection of the migratory background but intersectional with potential discrepancies in socio-economic equality of opportunity, and that these may be more prevalent in students with a migratory background.

Furthermore, where the HE proves to have high attrition, and in particular amongst its international students, there should be extensive provision of introductory support courses to support students who enter the HEI but need extra support in certain subjects. The HEIs are ensuring that students have the option to gain access to and can address deficits. These support classes provide much more – they create a social climate (Multrus et al 2005) that can support students interaction and integration, by providing a space and common ground amongst students, this common ground allows for interaction, and should function in such a manner that it reduces the likelihood of anonymity. By reducing the likelihood of anonymity, the HEIs are reducing the likelihood of dropout, and supporting the process toward success. Not only that, but this social space creates a structure, and such decentralised structures encourage interaction which not only reduces the likelihood of dropout but increases the productivity of the group (Etzioni, 1990).

In summary, the personal, cultural, and structural importance means that the international students are as capable of completing a programme as their German colleagues. It does however entail an important aspect of our societies, which a growing number of students, and HEI staff should experience their HE years as a source of potential and success. The positive spin-off of the international students' success rates is important to ensure the continued beneficial aspects that this brings to our societies – including a healthier, happier physical and mental disposition that in turn includes positive contributions to the economy and society in general (Bok 2017). The international students' success rates in Germany's HEIs show that international students are comparable and that we can and should learn from how they succeed.

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11 Appendix:

11.1.1 Timeline of developments of the Europeanisation of higher education

1998	Sorbonne Declaration (with France, Germany, Italy, and the UK as the four signatories)
1999	The Bologna Declaration (with than 30 countries signing)
2001	The Prague Communique (with an enlargement up to 33 signatories – and develop the aims to lifelong learning)
2003 –	The Berlin Communique (with an enlargement to 40 countries and connection the European Area of Higher Education to the area of European Research)
2005	The Bergen Communique (with the aim of increasing the accessibility of HE for all also globally, and further developing focus on the doctoral part of the cycle)
2007	The London Communique (with the expansion to 46 signatories and reassessing the progress)
2009	The Leuven Communique (with interconnection of education into all domains of our lives, so that the continual improvement what education can provide, plus structurally it would be chaired by two bodies an EU and non-EU signatory)
2010	The Budapest/ Vienna Communique (with the expansion to 47 signatories and the launching of the European Higher Education Area, this certified the attainment of the Bologna Declaration's aims.

2012	The Bucharest Communique (with the aims of reaching sustainable growth, also employment) – also that an aim was set that one fifth of graduates within the EU should also have spent time studying abroad)
2015	The Yerevan Communique (with Belarus being the 48th signatory – and working on development for the BFUG – Bologna Follow Up Group)

(Own Illustration, EHEA 2020)

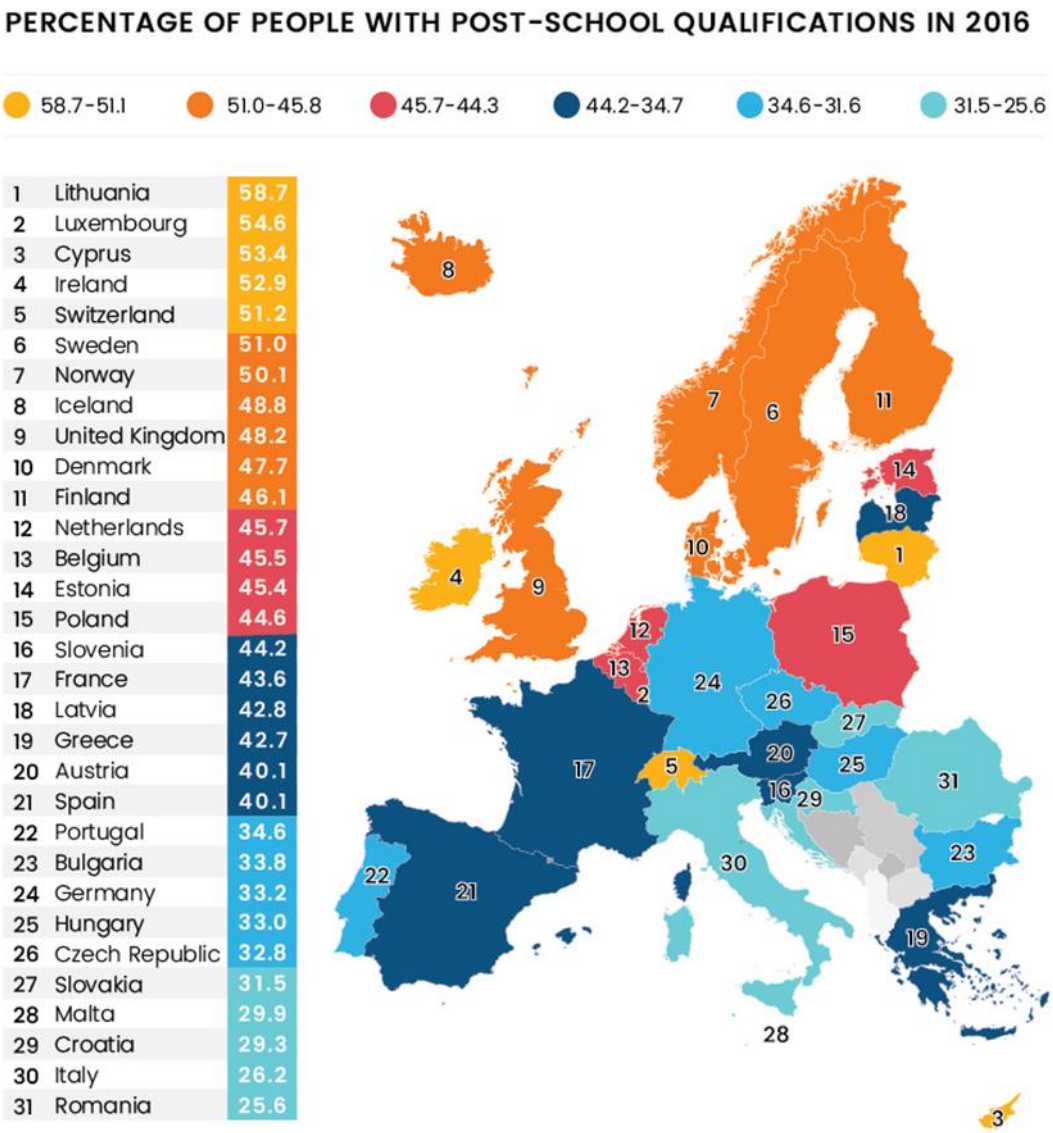
11.1.2 List of files

Winter Files	Student	Exam
1995	ws	ws
1996	ws/ss	ws/ss
1997	ws/ss	ws/ss
1998	ws/ss	ws/ss
1999	ws/ss	ws/ss
2000	ws/ss	ws/ss
2001	ws/ss	ws/ss
2002	ws/ss	ws/ss
2003	ws/ss	ws/ss
2004	ws/ss	ws/ss
2005	ws/ss	ws/ss
2006	ws/ss	ws/ss
2007	ws/ss	ws/ss
2008	ws/ss	ws/ss
2009	ws/ss	ws/ss
2010	ws/ss	ws/ss
2011	ws/ss	ws/ss
2012	ws/ss	ws/ss
2013	ws/ss	ws/ss
2014	ws/ss	ws/ss
2015	ss	ss

11.1.3 Cohorts

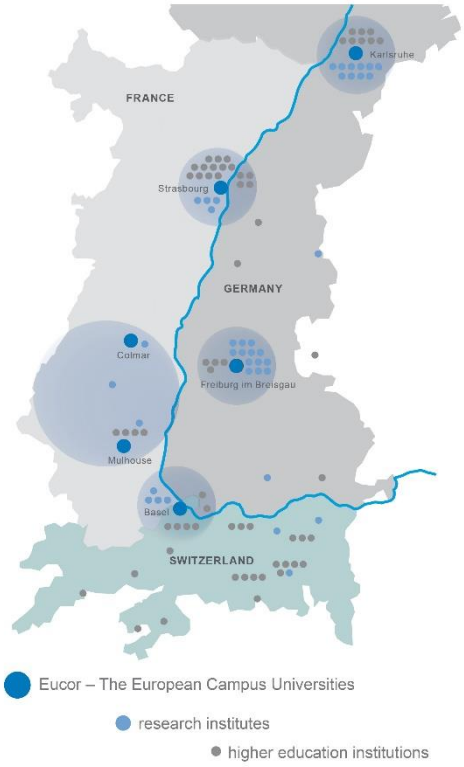
Cohort	Year First Semester WS Dip/BSc	Year First WSSemester AUS	Regular Study Time	Regular Study Time plus 1 year	Regular Study Time plus 2nd year	Final Exam Summer Semester
c1	1995/97	1996/97	upto SS00	WS00/SS01	WS01/SS02	2002
c2	1996/98	1997/98	upto SS01	WS01/SS02	WS02/SS03	2003
c3	1997/99	1998/99	upto SS02	WS02/SS03	WS03/SS04	2004
c4	1998/00	1999/00	upto SS03	WS03/SS04	WS04/SS05	2005
c5	1999/01	2000/01	upto SS04	WS04/SS05	WS05/SS06	2006
c6	2000/02	2001/02	upto SS05	WS05/SS06	WS06/SS07	2007
c7	2001/03	2002/03	upto SS06	WS06/SS07	WS07/SS08	2008
c8	2002/04	2003/04	upto SS07	WS07/SS08	WS08/SS09	2009
c9	2003/05	2004/05	upto SS08	WS08/SS09	WS09/SS10	2010
c10	2004/06	2005/06	upto SS09	WS09/SS10	WS10/SS11	2011
c11	2005/07	2006/07	upto SS10	WS10/SS11	WS11/SS12	2012
c12	2006/08	2007/08	upto SS11	WS11/SS12	WS12/SS13	2013
c13	2007/09	2008/09	upto SS12	WS12/SS13	WS13/SS14	2014

11.1.4 Map including European Countries[155]



[155] https://www.openaccessgovernment.org/wp-content/uploads/2018/05/people-with-post-school-qualifications-map.jpg

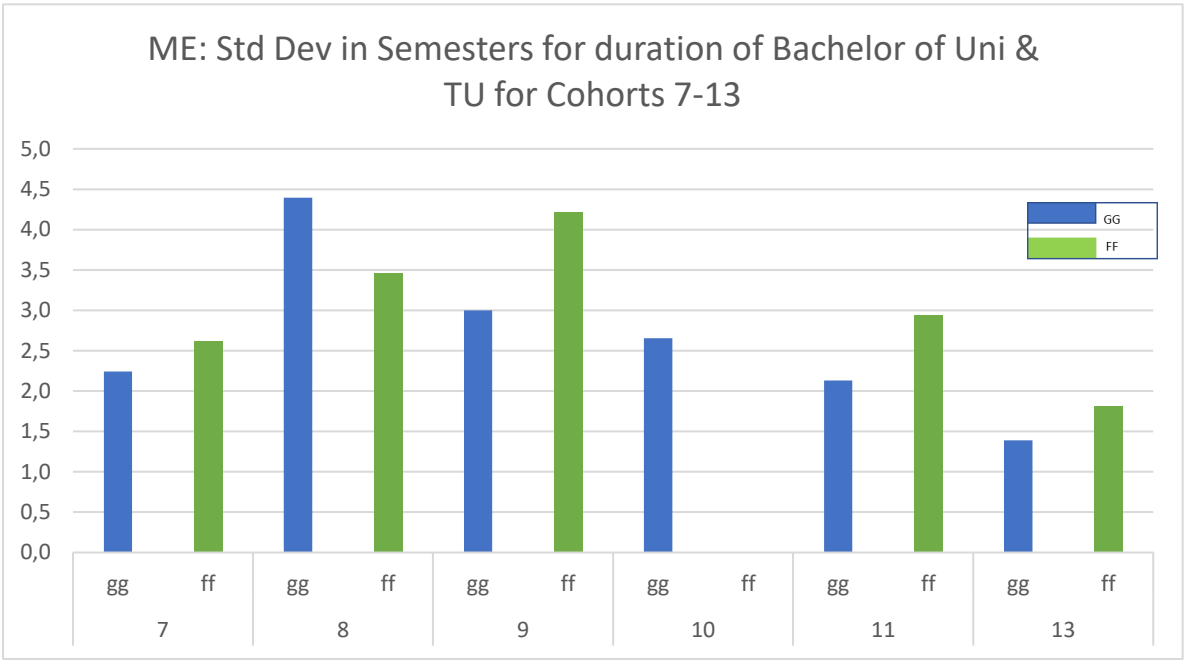
11.1.5 The EUCOR map [156]



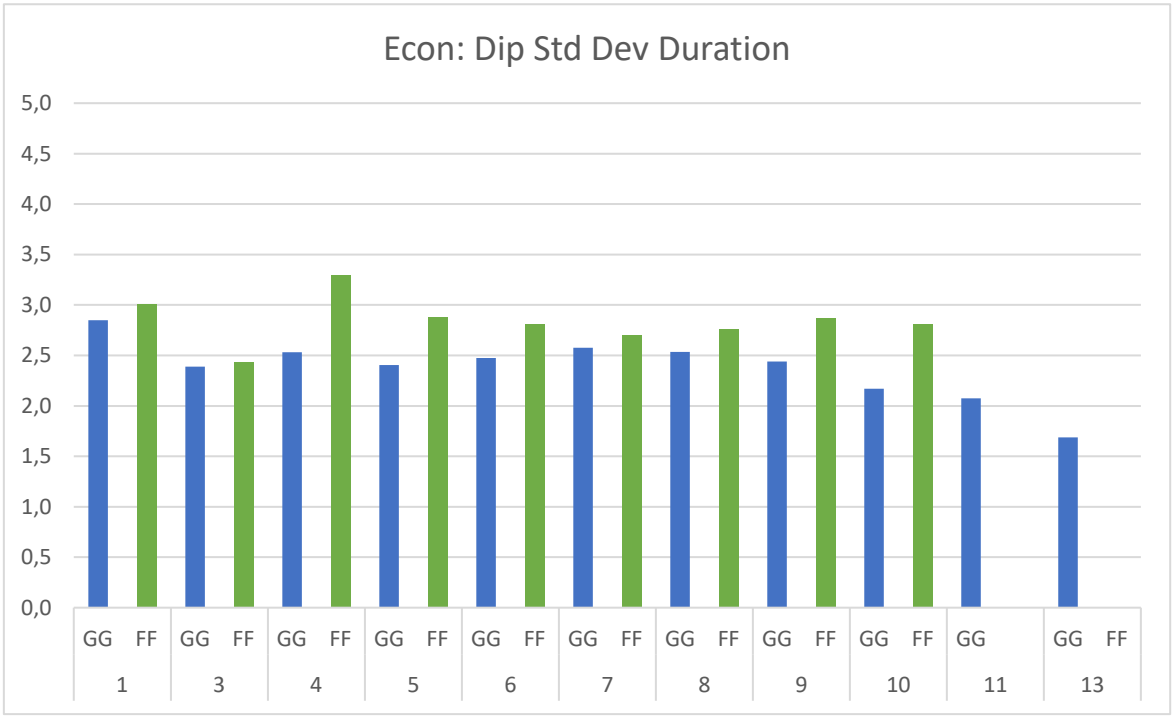
156

https://www.google.de/search?q=map+of+universities+german+french+border&tbm=isch&source=hp&sa=X&ved=2ahUKEwjmma3BpunhAhUN66QKHXtlCWQQsAR6BAgIEAE&biw=1441&bih=686#imgrc=AV469UPR4DGZSM:

11.1.6 Duration of Dipl and Bachelor students according to their groups



Econ: Dipl – Std. Dev Duration of Dipl.



Appendix: Further cohort analyses

Correlations GG ME TU/U			
		Synthetic Starter	Cohort
Cohort	Pearson Correlation	,928**	1
	Sig. (2-tailed)	0,000	
	N	13	13
**. Correlation is significant at the 0.01 level (2-tailed).			

Correlations FG ME TU/U			
		Synthetic Starter	Cohort
Cohort	Pearson Correlation	,906**	1
	Sig. (2-tailed)	0,000	
	N	13	13
**. Correlation is significant at the 0.01 level (2-tailed).			

Correlations FF ME TU/U			
		Synthetic Starter	Cohort
Cohort	Pearson Correlation	,850**	1
	Sig. (2-tailed)	0,000	
	N	13	13
**. Correlation is significant at the 0.01 level (2-tailed).			

Correlations EE TU/U			
		Synthetic Starter	Cohort
Cohort	Pearson Correlation	,853**	1
	Sig. (2-tailed)	0,000	
	N	13	13
**. Correlation is significant at the 0.01 level (2-tailed).			

Correlations FG EE TU/U			
		Synthetic Starter	Cohort
Cohort	Pearson Correlation	,747**	1
	Sig. (2-tailed)	0,003	
	N	13	13
**. Correlation is significant at the 0.01 level (2-tailed).			

Correlations FF EE TU/U			
		Synthetic Starter	Cohort
Cohort	Pearson Correlation	,747**	1
	Sig. (2-tailed)	0,003	
	N	13	13
**. Correlation is significant at the 0.01 level (2-tailed).			

Correlations GG Econ U			
		Synthetic Starter	Cohort
Cohort	Pearson Correlation	,885**	1
	Sig. (2-tailed)	0,000	
	N	12	12
**. Correlation is significant at the 0.01 level (2-tailed).			

Correlations FG Econ U			
		AbsoluteStarterSyn	Cohort
Cohort	Pearson Correlation	0,437	1
	Sig. (2-tailed)	0,155	
	N	12	12

Correlations FF Econ U			
		Synthetic Starter	Cohort
Cohort	Pearson Correlation	0,439	1
	Sig. (2-tailed)	0,153	
	N	12	12

11.1.7 ME, EE & Econ: Values for synthetic variable for all 13 cohorts

Group	Mean	Median	Minimum	Maximum
GG	43,2	42,7	30,3	58,3
FG	26,3	25,2	15,5	47,0
FF	49,2	46,0	32,7	90,0

Source: FDZ – Own illustration

Correlation ME Synthetic Success Rates with Cohort

Correlations GG ME TU/U

		Synthetic Success Rates	Cohort
Cohort	Pearson Correlation	0,272	1
	Sig. (2-tailed)	0,369	
	N	13	13

Correlations GG ME TU/U

			Synthetic Success Rates	Cohort
Kendall's tau_b	Synthetic Success Rates	Correlation Coefficient	1,000	0,104
		Sig. (2-tailed)		0,624
		N	13	13
Spearman's rho	Synthetic Success Rates	Correlation Coefficient	1,000	0,182
		Sig. (2-tailed)		0,552
		N	13	13

Correlations FG ME U

		Synthetic Success Rates	Cohort
Cohort	Pearson Correlation	0,310	1
	Sig. (2-tailed)	0,303	
	N	13	13

Correlations FG ME U

			Synthetic Success Rates	Cohort
Kendall's tau_b	Synthetic Success Rates	Correlation Coefficient	1,000	0,168
		Sig. (2-tailed)		0,427
		N	13	13
Spearman's rho	Synthetic Success Rates	Correlation Coefficient	1,000	0,250
		Sig. (2-tailed)		0,409
		N	13	13

Correlations FF ME U

		Synthetic Success Rates	Cohort
Synthetic Success Rates	Pearson Correlation	1	-0,454
	Sig. (2-tailed)		0,119

	N	13	13

Correlations FF ME U

			Synthetic Success Rates	Cohort
Kendall's tau_b	Synthetic Success Rates	Correlation Coefficient	1,000	-0,256
		Sig. (2-tailed)		0,222
		N	13	13
Spearman's rho	Synthetic Success Rates	Correlation Coefficient	1,000	-0,363
		Sig. (2-tailed)		0,223
		N	13	13

Correlation EE

Correlations GG EE U

		Synthetic Success Rates	Cohort
Synthetic Success Rates	Pearson Correlation	1	-0,075
	Sig. (2-tailed)		0,806
	N	13	13

Correlations GG EE U

			Synthetic Success Rates	Cohort
Kendall's tau_b	Synthetic Success Rates	Correlation Coefficient	1,000	-0,051
		Sig. (2-tailed)		0,807
		N	13	13
Spearman's rho	Synthetic Success Rates	Correlation Coefficient	1,000	-0,027
		Sig. (2-tailed)		0,929
		N	13	13

Correlations FG EE U

		Synthetic Success Rates	Cohort
Synthetic Success Rates	Pearson Correlation	1	-0,398
	Sig. (2-tailed)		0,329
	N	8	8
Cohort	Pearson Correlation	-0,398	1
	Sig. (2-tailed)	0,329	
	N	8	13

Correlations FG EE U

			Synthetic Success Rates	Cohort
Kendall's tau_b	Synthetic Success Rates	Correlation Coefficient	1,000	-0,357
		Sig. (2-tailed)		0,216
		N	8	8
Spearman's rho	Synthetic Success Rates	Correlation Coefficient	1,000	-0,476
		Sig. (2-tailed)		0,233
		N	8	8

Correlations FF EE U

		Synthetic Success Rates	Cohort
Synthetic Success Rates	Pearson Correlation	1	-0,413
	Sig. (2-tailed)		0,161
	N	13	13

Correlations FF EE U

			Synthetic Success Rates	Cohort
Kendall's tau_b	Synthetic Success Rates	Correlation Coefficient	1,000	-0,231
		Sig. (2-tailed)		0,272
		N	13	13
Spearman's rho	Synthetic Success Rates	Correlation Coefficient	1,000	-0,363
		Sig. (2-tailed)		0,223
		N	13	13

Correlations Econ Success Rates with Cohorts.

Correlations GG Econ U

		Synthetic Success Rates	Cohort
Synthetic Success Rates	Pearson Correlation	1	,617*
	Sig. (2-tailed)		0,033
	N	12	12

*. Correlation is significant at the 0.05 level (2-tailed).

Correlations GG Econ U

			Synthetic Success Rates	Cohort
Kendall's tau_b	Synthetic Success Rates	Correlation Coefficient	1,000	,473*
		Sig. (2-tailed)		0,033
		N	12	12
Spearman's rho	Synthetic Success Rates	Correlation Coefficient	1,000	,595*
		Sig. (2-tailed)		0,041
		N	12	12

*. Correlation is significant at the 0.05 level (2-tailed).

Correlations FG Econ U

		Synthetic Success Rates	Cohort
Synthetic Success Rates	Pearson Correlation	1	,664*
	Sig. (2-tailed)		0,019
	N	12	12

*. Correlation is significant at the 0.05 level (2-tailed).

Correlations FG Econ U

			SyntheticSuccessRate	Cohort
Kendall's tau_b	SyntheticSuccessRate	Correlation Coefficient	1,000	,485*
		Sig. (2-tailed)		0,028
		N	12	12
Spearman's rho	SyntheticSuccessRate	Correlation Coefficient	1,000	,622*
		Sig. (2-tailed)		0,031
		N	12	12

*. Correlation is significant at the 0.05 level (2-tailed).

Correlations FF Econ U

		Synthetic Success Rates	Cohort
Synthetic Success Rates	Pearson Correlation	1	0,533
	Sig. (2-tailed)		0,074
	N	12	12

Correlations FF Econ U

			Synthetic Success Rates	Cohort
Kendall's tau_b	Synthetic Success Rates	Correlation Coefficient	1,000	,455*

		Sig. (2-tailed)		0,040
		N	12	12
Spearman's rho	Synthetic Success Rates	Correlation Coefficient	1,000	0,566
		Sig. (2-tailed)		0,055
		N	12	12

*. Correlation is significant at the 0.05 level (2-tailed).

12 Comment

The potential impact of the results is a contemporary issue that has led to numerous policy decisions that create an environment of "production" rather than "education" (Shay 2018) – this polarisation is something that this work is aware of and therefore emphasizes that the results that show HEIs success rates of their international students is positive because it facilitates increased transparency.