# Performance of Higher Education Sector in terms of Social Benefit and Ethics

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# ABSTRACT

There is no doubt that the human factor, especially the specialized, entrepreneurial and creative human resources, plays a pivotal and fundamental role in growth and development of countries. Therefore, the role of education at all levels should be the promotion of the skills of the individual, while at the same time giving him a purpose as well as a mission to benefit both himself as well as the labor market.

The purpose of this study is to investigate the relationship between the financial contribution of the government to university and unemployment rate of graduates. Parallel to this, the study seeks to find out the extent to which the enrolment of female students and the enrolment of international students contribute to the creation of new patents in the economy concerned.

Accordingly, 5 countries have been selected as the study's sample including the United States, the United Kingdom, the Netherlands, Germany and Malaysia.

Based on the analysis on the collected data it was concluded that in the United States, United Kingdom and Netherlands, general need of the labor market for educated people has been met, but the number of graduates is still increasing, leading to rising unemployment rate of graduates at the community level. Also, according to the results and statistical analysis, the output of universities in United States, United Kingdom, Germany and Netherlands have not been able to increase the level of creativity and innovation in the society. Meanwhile, it is only in Malaysia that if the presence of women in universities increases, we can see a growth in the rate of creativity and innovation in this country.

The importance of the results of this research is that with the cooperation and interaction between higher education institutions, policy makers and the labor market, the educational curriculum can be designed based on the needs of these three groups. Also, the structure of student admission should be revised so that by educating qualified people will result in increasing of the number of applicable innovations.

**Keywords:** Higher Education, Graduates Unemployment Rate, Innovation and Creativity

# ÖZ

Hiç şüphe yok ki insan faktörü, özellikle uzmanlaşmış, girişimci ve yaratıcı insan kaynakları, ülkelerin büyümesinde ve gelişmesinde çok önemli ve temel bir rol oynamaktadır. Bu nedenle, eğitimin her düzeyde rolü, bireyin becerilerinin geliştirilmesi ve aynı zamanda ona hem kendisine hem de topluma fayda sağlama misyonunun yanı sıra bir amaç vermesi olmalıdır.

Bu çalışmanın amacı, devletin üniversiteye olan mali katkısı ile mezunların işsizlik oranı arasındaki ilişkiyi incelemektir. Buna paralel olarak, çalışma, kız öğrencilerin ve uluslararası öğrencilerin kayıtlarının ilgili ekonomide yeni patentlerin oluşturulmasına ne ölçüde katkıda bulunduğunu bulmayı amaçlamaktadır.

Buna göre, araştırmanın örneklemi olarak Amerika Birleşik Devletleri, Birleşik Krallık, Hollanda, Almanya ve Malezya dahil 5 ülke seçildi.

Toplanan verilerin analizine dayanarak, Birleşik Devletler, Birleşik Krallık ve Hollanda'da, eğitimli insanlar için işgücü piyasasının genel ihtiyacının karşılandığı halde mezun sayısının gün geçtikçe artması topluluk düzeyinde mezunların işsizlik oranının artmasına yol açtığı sonucuna varılmıştır. Ayrıca, sonuçlara ve istatistiksel analize göre, Birleşik Devletler, Birleşik Krallık, Almanya ve Hollanda'daki üniversitelerin çıktıları toplumdaki yaratıcılık ve yenilikçilik düzeyini yükseltememiştir. Bu arada, Malezya'da görüldüğü üzere, üniversitelerde kadınların varlığı arttırılırsa, o ülkede yaratıcılık ve yenilikçilik oranında büyüme görebilceğimiz örneklenmiştir.

Bu araştırmanın sonuçlarının önemi, yüksek öğretim kurumları, politika yapıcılar ve işgücü piyasası arasındaki işbirliği ve etkileşim sayesinde, eğitim müfredatının bu üç grubun ihtiyaçlarına göre tasarlanabilmesidir ve bu da sonuçta sosyal refaha yol açar. Ayrıca, nitelikli insanlar yetiştirerek uygulanabilir yeniliklerin toplumun genel kullanımına uygun olabilmesi için öğrenci kabulünün yapısı adil olmalıdır.

**Anahtar Kelimeler:** Yüksek Öğrenim, Mezun İşsizlik Oranı, Yenilikçilik ve Yaratıcılık

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# INTRODUCTION

## 1.1 Higher Education and Reality of the Market

Marginson (2006) and Lee (2014) reported that higher education has become a congested market, still, infinitely prone to transitional changes, being impacted by digitally oriented world and its surrounding environment. Intellectual scholars, leaders, and decision-makers of renowned establishments who have had a tremendous impact on the rejuvenation of academic landscape have determined to anticipate how many environmental trends will have a profound role in decision-making strategies of universities globally for attracting international students.

Giphs and Morphay (2009) have attested to the fact that business intervention and corporate practices have become a norm of today when it comes to academic affairs, to the extent that some scholars have argued there is a need to establish adjusting articulation between marketing logic and academic settings. In addition, other scholars (Pucciarelli and Kaplan, 2016; Stansakar, 2007; Giphs and Morphay, 2009) argued that higher education institutes require to generate competitive strategies to appraise the factors behind the change, therefore, ignite sufficient responses to cope with such changes, side by side, fostering ethical policies and socially beneficial, well-oriented strategical frameworks which allow them to attain that healthy competitive edge among their rivals.

Altbach (2009) stated that university mission always has been hovering around these three chief challenges, teaching, research, and public service. Moreover, the Council of European Union (2014) declared that higher-education agencies, on one hand, must act like profit-organizations, concentrating on the generation of lucrative revenue more than anything, on the other hand, they must present themselves as a non-profit organization, highlighting optimal public servicing as anchors of knowledge to build up better educational proliferation.

The goal of this study is to investigate the impact of government contribution to universities on graduates unemployment rate and rate of international/female studants impact on patent numbers.

What has been achieved seems to be that that universities have succeeded in creating new programs that attract more international students, but their activities have still failed in reducing unemployment rate and increasing employment rate of graduates. Many studies point out that control tools such as using ranking methods and monitoring academic performance, periodic assessment and matching the needs of the labor market with the academic courses offered in universities, conducting survey projects to obtain feedback on the performance of universities from the perspective of economic and policies of the government, controlling and monitoring student admission practices and measuring the level of adherence to principles have not been used effectively.

## 1.2 The Impact of University Education on the Performance of University Stakeholders

As study by Binsardi and Ekwulugo (2003) purported all marketing activities should pertain to the customer's needs. This is an approach which can apply to the clients of higher education as well. Typically, stakeholders who stand to gain or lose from the performance of the university as customers include students, the job market and the society. In addition, Binsardi and Ekwulugo (2003) argued that if the customer needs are met by universities, graduates will be more easily and quickly attracted to the labor market and earn money, and the business community will benefit from the presence of qualified people.

According to Cai, Youngblood, Khodyreva, & Khuziakhmetov (2017) study, there should be a comprehensive interaction between the universities and its stakeholder in order to cover the real need of thelabor market demands.

Studies in the 1990s revealed that higher education institutions, to market themselves successfully, must scrutinize their decision-making strategies based on the demands of potential students, browsing for top educational information (Mortimer, 1997; Gatefield, 1999). Some authors on the subject believe that students have to be entertained as customers and the courses provided for them to be considered as products, while others believed that employers of the university would be the potential clients and students would be a potential commodity (Conway, 1994).

Also, Hemsley and Oplatka (2006) argue that the higher education institutions were hailing students as consumers and such intense marketization attested to the bitter

reality that higher education was being converted into a monetizing business commodity.

Accordingly, Litan, Reedy, & Mitchell (2007) illustrated that tertial systems around the world should transplant all those technologies elaborated in the academic area to society to maximize the efficiency of the labor market.

According to the researches (Bevis, 2002; Harrison, 2002), the USA's capacities on accepting international students, with the admission of foreign students, the host country can use this diversity to advance and improve its intellectual community as well as its scientific and professional potential. This approach can even lead to cultural promotion in the host country and also contribute to its social well-being. Of course, the problems of foreign students entering the destination country are not just obtaining admission, and there are other obstacles to entry. As stated in Slaughter and Rhoades (2004) research, problems such as political sanctions that lead to visa bans, high tuition costs, especially in the higher academic levels, have a significant impact on this matter.

In this regard, another study by Erdoğan, A., & Erdoğan, M. M. (2018) focuses on Syrian students in Turkey. They found that the number of Syrian students in 140 Turkish state universities was 15,000, of whom only 5,300 were female. The share of Syrian students in Turkish universities was less than 2%, while the share of Syrian women in this category was 35%.

## 1.3 Gender and Nationality of Students in Higher Education

Nedbalova, Greenacre and Schulz (2014) declared that it has been assumed that the nature of higher education always has to embody the public good, although there have been findings that some universities have sacrificed some aspects of higher education for market values in search of revenue and higher profits.

Therefore, any discourse on the public aspect of higher education must embrace, on the one hand, sustainability and competitiveness in the market as suggested by Friga and Sullivan (2003) and on the other hand, it has to promote its capacity to anchor value for society via decent creation and circulation of knowledge (Healey, 2008).

Meanwhile, criticism and condemnation from National Commission for Certifying Agencies abbreviated as (NCCA) breach of protocols to fabricated research have perverted the image of plenty of universities globally, since, unfortunately, deregulation has penetrated the academic sphere. Performance defections encompassing gender bias, culture cancelling, marginalization, and exclusion of minority communities, research manipulation and tampering with information have backfired on the reputation of universities, specifically renowned ones around the globe (Cullen, Latessa, 2002). Lederman (1992) and Turner (1999) illustrated that such scandalous revelation has been the rationale behind exacerbation of public trust and degradation of university ranking, its credibility when it comes to accreditation in public eyes and academic diaspora.

Related to the usage of proper strategies in academic atmosphere, a previous study (Haj, Geanta, & Orr ,2018) agreed that, although European schools in their own agenda have elaborated plans for expanding the equity features of their educational

system (European Commission 2010; United Nations 2016), there still are more gaps related to students admission. However, Haj et al. (2018) suggested a re-evaluation for educational system in European countries to establish a suitable admission system in their educational institutes.

## 1.4 Study Aim and Objectives

This study aims to investigate two things: governmental assistance to the universities and its impact on unemployment rate among graduates and the impact of female students and international students admitted to the universities on the number of new patents.

Analysis of data in this thesis which is gathered from the statistics of the United States, the Netherlands, Malaysia, Germany and United Kingdom shows that universities have been more active in covering their costs and generating revenue, trying to provide services that are being offered to students by other competitors. Universities in these geographical areas have not been able to bridge the gap between the needs of the labor market and provide a fair environment for students eager to innovate. Therefore, there is a mismatch between the strategies adopted by these universities and the needs of the community and its individuals.

## 1.5 Methodology

In this thesis, a quantitative method is applied. The five geographical areas including the Netherlands, Germany, the United Kingdom as representative of Europe, the United States as representative of North America, Malaysia as representative of Asia are selected and the reasons for choosing them are fully described in Chapter 4. The data used is secondary data type. The three hypotheses are based on the model designed in Figure 3 mentioned in chapter 3.

## 1.6 Significance and Contribution of this Study

The university is usually expected to have responsibilities towards its stakeholders, to solve the problems of its environment. Higher education institutions are accountable to provide appropriate courses to help communities in order to reduce graduate unemployment rate.

Therefore, the weak relationship between the universities, labor market and government does not mean unsteady universities policies and procedures. This issue is raised because of the inappropriate cooperation among these stakeholders. In any case, these institutions must consider the desired and unintended consequences of their actions for society.

# Chapter 2

# LITERATURE REVIEW

## 2.1 Female Students

On trend of female and male enrollment in universities in Germany, Francesconi & Parey (2018) indicated that from the post-WWII period to the early 1990s, significantly more men than women entered a college program, with a female-to-male student ratio of 0.4–0.6. Since 1995 and up to 2015, however, the numbers have become very similar. The share of females enrolled has therefore steadily increased since 1995, from a ratio of 0.91 per male student, and reaching parity in 2015, when we observe a ratio of 1.002 which is shown in Figue 1.

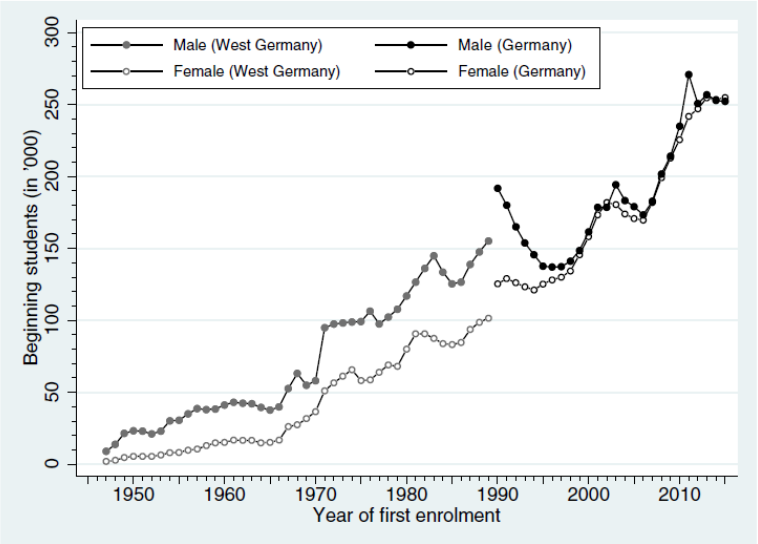


Figure 1: Trend of Female and Male Enrollment in Universities in Germany - Francesconi & Parey (2018)

In Malaysia, government's policy to advance women's role in development was embodied in the National Policy for Women, launched in 1989, and a chapter on women was included in the Sixth Malaysia Plan (Malaysia 1991: Chapter 16). Nagaraj, Goh, Cheong, Tey & Jani (2014) reported that between 1970 and 2012, tertiary enrolment of females increased from 0.6 per cent to 42.0 per cent.

In addition, in 2007 and 2011, there is an increasing rate of female graduates from 56.9% to 57.1%; and interestingly, there is a slight growth of female graduates in fields of science (67.6% to 74%) and Technical (31.5% to 32%) which is shown in Table 1.

Table 1: Percentage Distribution of University Graduates by Field and Gender in Malaysia - Nagaraj, Goh, Cheong, Tey & Jani (2014)

| Field of study | 2007 | | | 2011 | | |
|---|---|---|---|---|---|---|
| | Male | Female | % Female | Male | Female | % Female |
| Arts | 26.4 | 47.9 | 70.5 | 32.4 | 49.8 | 67.2 |
| Science | 8.6 | 13.6 | 67.6 | 8.5 | 18.3 | 74.0 |
| Technical | 47.5 | 16.6 | 31.5 | 43.2 | 15.2 | 32.0 |
| ICT | 10.9 | 9.7 | 54.0 | 10.8 | 7.6 | 48.5 |
| Education | 6.6 | 12.2 | 70.9 | 5.1 | 9.1 | 70.3 |
| All graduates | 100.0 | 100.0 | 56.9 | 100.0 | 100.0 | 57.1 |

*Source*: Graduate Tracer Survey, Ministry of Higher Education Malaysia

Tienxhi (2017) indicated that the trend of female students which is shown in Figure 2, has been increased gradually and the gap between female and male attainment in universities has been expanded. In 2009, the gap between male and female students was 67,734 students and in 2013 amounted to 86,798 students.

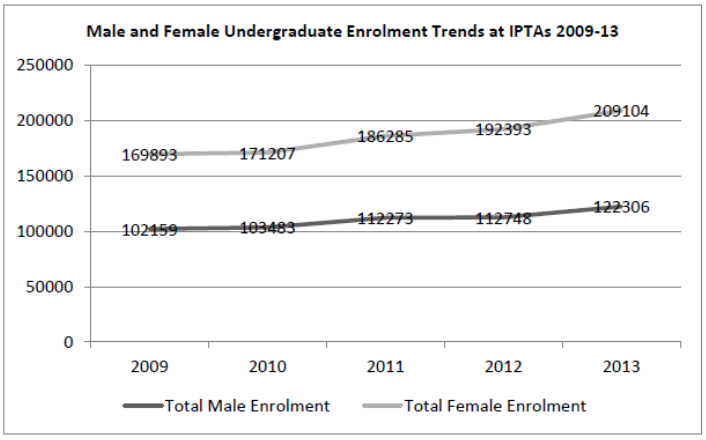


Figure 2: Male and Female Enrollment Trend in Universities in Malaysia - Tienxhi (2017)

Lett, Murdock, Orji, Aysola, & Sebro (2019) conducted a research on trends in racial, ethnic and gender representation among United States medical students. In this study, it is indicated that from 2002 to 2017, the number of enrolled students in medical schools increased 29.3%, from 16 488 to 21 326. In this period, the number of black female students declined from 0.65 to 0.53, and the rate for black male students was unchanged at approximately 0.36. The rate for Hispanic female matriculants varying between 0.40 and 0.45. The ratio for white male students increased from 1.04 to 1.10, and the rate is decreased for white female students from 0.91 to 0.88 which is shown in Figure 3.

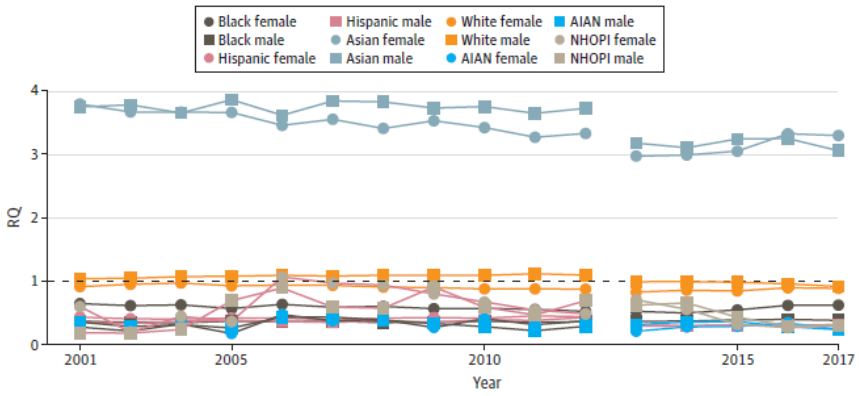


Figure 3: Trends in Racial, Ethnic and Gender Representation Among United States Medical Students - Lett, Murdock, Orji, Aysola, & Sebro (2019)

According to Kondo research in 2015, the recession in the labor market of United States can be a motivating factor for entering college as well as getting a part-time job for a large number of people. This happens more in women than men in the Unites States. According to the study, a one percent increase in the unemployment rate leads to one percent growth in the number of women entering the university (Kondo, Ayako, 2015).

## 2.2 Racial Discrimination

Hanassab (2006) indicated universities for discrimination among the students. A study on the level of discrimination reported by international students studying in the United States found that in the 5 factors including “Interacting with professors”, “Interacting with university staff”, “Interacting with classmates”, “Apply for job on campus” and “Prejudice in Los Angeles toward people from your country”; the students from Middle East (ME) have the highest percentages in “Interacting with classmates” with 22%, “Apply for job on campus” with 17% and “Prejudice in Los Angeles toward people from your country” with 46% among sample groups. Although students from Middle East experienced the highest percentages, students from Africa (AF) and Southeast Asia (SEA) have experienced the highest percentages in “Apply for job on

campus" and "Interacting with professors" with 17% and 21% respectively. In contrast, students from America (AM), Europe (EU) and Oceania (OC) have the lowest percentages. The study was conducted in a quantitative manner between 640 UCLA students.

Table 2: Percentage of Students Experiencing Discrimination by Region (Hanassab, 2006)

| Area of Discrimination | AF | AM | AS | EU | ME | OC | SEA |
|---|---|---|---|---|---|---|---|
| Interacting with professors | 17% | 6% | 16% | 5% | 11% | 14% | 21% |
| Interacting with university staff | 17% | 11% | 19% | 12% | 15% | 14% | 14% |
| Interacting with classmate(s) | 20% | 21% | 21% | 8% | 22% | 14% | 16% |
| Applying for a job on campus | 17% | 10% | 13% | 5% | 17% | 0% | 12% |
| Prejudice in Los Angeles toward people from your country | 33% | 36% | 29% | 19% | 46% | 0% | 16% |

Note: The higher the percentage, the greater number of students experienced discrimination in each of the contexts. The numbers refer to the percentages of international students who answered "yes" to the statements regarding discrimination. AF = Africa, AM = Americas, AS = Asia, EU = Europe, ME = Middle East, OC = Oceania, SEA = Southeast Asia.

This research was conducted in two formats: questionnaire and open-ended questions. According to Hanassab (2006) stataed, discrimination comes in many forms and often depends on people's perceptions.

In 2019, the Students for Fair Admissions (SFFA) claims that Harvard University prioritizes white, black, and Spanish student applications over Asian American students, some of whom are weaker than Asian American students.

As BBC reported (Harvard University cleared of racial bias in admissions process (2019, October 01), Harvard allegedly places Asian-American student applications in a lower category based on racial characteristics. Harvard University has denied the allegations, saying that the rate of admission of Asian American students to the

university has increased. According to the Students For Fair Admissions (SFFA), Harvard University does not consider race an important factor, and the admission rates for African American and Spanish students are higher. For example, an Asian American student has a 25 percent chance of being accepted, while a white student has a 35 percent chance of being accepted, a Spanish student has a 75 percent chance, and an African American student has a 95 percent chance (www.bbc.com).

Table 3: Percentages of Foreign Students in European Union Countries (2010-2019)

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| European Union - 27 countries (from 2020) | 19.0 | 19.3 | 19.9 | 20.3 | 21.2 | 21.6 | 22.0 | 22.8 | 23.4 | 24.2 |
| European Union - 28 countries (2013-2020) | 20.9 | 23.9 | 24.5 | 24.7 | 25.4 | 26.0 | 26.6 | 26.8 | 27.4 | 28.1 |
| European Union - 15 countries (1995-2004) | 20.8 | 23.9 | 24.4 | 24.6 | 25.4 | 25.9 | 26.6 | 26.7 | 27.2 | 27.9 |
| Euro area - 19 countries (from 2015) | 18.4 | 18.8 | 19.4 | 19.7 | 20.4 | 20.9 | 21.2 | 22.0 | 22.5 | 23.4 |
| Belgium | 29.7 | 28.5 | 29.5 | 29.1 | 30.3 | 30.7 | 30.6 | 33.5 | 35.1 | 34.3 |
| Bulgaria | : | : | : | 37.3 | : | : | 37.5 | 41.6 | 41.7 | 39.0 |
| Czechia | 25.0 | 28.5 | 28.1 | 31.8 | 33.1 | 29.6 | 32.7 | 32.9 | 31.8 | 32.0 |
| Denmark | 27.0 | 26.7 | 27.8 | 29.3 | 35.5 | 37.4 | 39.9 | 39.6 | 39.1 | 40.0 |
| Germany (until 1990 former territory of the FRG) | 17.3 | 18.8 | 19.2 | 19.9 | 19.3 | 19.4 | 20.8 | 21.5 | 21.5 | 21.8 |
| Estonia | 24.0 | 26.5 | 26.0 | 23.9 | 26.9 | 26.1 | 26.6 | 26.4 | 25.7 | 28.1 |
| Ireland | 44.9 | 44.8 | 46.2 | 46.8 | 46.8 | 49.1 | 51.9 | 52.0 | 52.5 | 51.7 |
| Greece | 9.3 | 8.9 | 10.4 | 10.8 | 10.9 | 10.5 | 11.3 | 12.5 | 10.4 | 10.4 |
| Spain | 20.2 | 20.4 | 20.6 | 21.0 | 22.5 | 22.1 | 21.7 | 22.5 | 23.5 | 25.8 |
| France | 20.1 | 20.5 | 21.2 | 24.2 | 24.9 | 25.7 | 26.0 | 26.0 | 26.7 | 27.0 |
| Croatia | 15.0 | 29.0 | 23.1 | 31.2 | 25.2 | 30.4 | 34.3 | 34.8 | 32.4 | 42.8 |
| Italy | 10.1 | 9.4 | 9.9 | 9.6 | 10.1 | 10.8 | 10.3 | 10.7 | 11.0 | 10.7 |
| Cyprus | 28.1 | 28.8 | 30.9 | 30.5 | 29.9 | 27.8 | 27.7 | 29.2 | 34.6 | 34.7 |
| Latvia | 18.0 | 16.7 | 15.4 | 16.3 | 14.7 | 18.4 | 18.4 | 18.6 | 17.7 | 20.0 |
| Lithuania | : | : | : | 34.1 | 40.8 | 43.6 | 48.4 | 49.6 | 54.8 | 46.6 |
| Luxembourg | 37.9 | 39.4 | 42.7 | 44.9 | 49.8 | 44.6 | 45.8 | 41.8 | 46.9 | 50.6 |
| Hungary | 24.1 | 25.3 | 26.3 | 25.5 | 32.4 | 32.9 | 26.8 | 28.1 | 29.9 | 34.0 |
| Malta | 30.7 | 26.5 | 26.4 | 36.3 | 40.2 | 34.7 | 29.5 | 36.4 | 40.2 | 42.0 |
| Netherlands | 26.2 | 27.0 | 29.1 | 24.3 | 24.9 | 27.0 | 27.3 | 28.3 | 28.0 | 38.3 |
| Austria | 18.8 | 17.8 | 18.8 | 19.9 | 27.3 | 29.3 | 28.5 | 28.9 | 29.5 | 30.6 |
| Poland | 37.6 | 39.4 | 39.8 | 43.4 | 46.7 | 50.0 | 45.5 | 51.9 | 54.0 | 50.2 |
| Portugal | 12.5 | 13.0 | 15.8 | 13.1 | 17.1 | 19.0 | 20.7 | 22.8 | 24.0 | 26.2 |
| Slovenia | 9.0 | 8.9 | 11.1 | 10.7 | 12.1 | 9.3 | 9.9 | 14.1 | 13.6 | 13.0 |
| Slovakia | 27.4 | : | 39.9 | 37.6 | 52.5 | 37.9 | 26.4 | 32.3 | 37.4 | 39.8 |
| Finland | 19.7 | 20.3 | 21.9 | 21.6 | 23.6 | 23.7 | 23.0 | 19.2 | 18.5 | 25.5 |
| Sweden | 38.8 | 38.3 | 36.5 | 37.2 | 39.3 | 39.3 | 41.6 | 43.3 | 41.3 | 39.9 |
| United Kingdom | 32.1 | 47.8 | 48.5 | 47.6 | 47.2 | 47.4 | 48.7 | 46.1 | 47.8 | 48.1 |
| Iceland | 26.2 | 27.2 | 24.8 | 26.2 | 21.6 | 28.0 | 28.1 | 34.7 | 36.7 | 42.7 |
| Norway | 37.5 | 36.9 | 37.8 | 41.0 | 42.4 | 41.7 | 39.8 | 38.3 | 35.9 | 34.5 |
| Switzerland | 27.6 | 28.8 | 30.3 | 32.4 | 33.5 | 34.0 | 35.5 | 36.2 | 37.6 | 38.7 |
| Montenegro | : | 24.3 | 22.7 | 20.7 | 22.8 | 20.9 | 20.9 | 22.7 | 23.4 | 20.4 |
| North Macedonia | : | : | 12.3 | 25.8 | : | : | : | : | : | 26.3 |
| Serbia | : | : | 23.2 | 16.3 | 20.2 | 22.9 | 31.6 | 32.7 | 29.0 | 29.9 |

Table 3 has been prepared by the European Union Council in 2019 which is also mentioned in Bileviciute, Draksas, Nevera, & Vainiute (2019), it contains information about percentages of foreign students who start their education in these countries. As it is obvious, there is no significant growth in the amount of Foreign Students as it would be expected from European Countries.

In addition, according to report of “Immigration of International Students to EU” conducted by The European Union (Migration and Home Affairs., 2012), the following policies are being implemented for expanding racial diversitfication of students:

> “Most (Member) States (Austria, Belgium, Bulgaria, Cyprus, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Lithuania, Luxembourg, Netherlands, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, United Kingdom, Norway) national policies focus predominantly on attracting international students to the higher education sector (i.e. Bachelor, Master and PhD courses). The main policy drivers are linked to the internationalisation of the higher education sector with a view to attracting high-level skills and building global academic knowledge networks (by facilitating mobility of students and teaching staff).”

The number of non-British students admitted to Cambridge University in 2014 was 35. In 2016, the number of these students at Oxford University was 26. This led to the reaction of the Prime Minister (David Cameron), who called the current situation worrying and requested for more transparency in the way students are admitted to the country's universities (Reay, D., 2018).

According to the Students for Fair Admissions (SFFA) which is cited in (Von Spakovsky, 2018) Harvard University admission officers are labeling the foreign applicants based on their nationality; for example, they prefer Asian Americans to African Americans and Hispanics.

Table 4: Percentage of Harvard's Admitted Class by Race (Von Spakovsky, 2018)

| | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|
| Asian American | 18% | 18% | 20% | 20% |
| African American | 11% | 12% | 10% | 11% |
| Hispanic | 10% | 12% | 11% | 11% |
| Native American | 3% | 2% | 2% | 2% |
| White | 48% | 49% | 52% | 53% |

**SOURCE:** *Students for Fair Admissions, Inc., v. President and Fellows of Harvard College et al.*, Plaintiff's Memorandum of Reasons in Support of Its Motion for Summary Judgment, p. 34, http://samv91khoyt2i553a2t1s05i-wpengine.netdna-ssl.com/wp-content/uploads/2018/06/Doc-413-Memo-in-Support-of-MSJ.pdf (accessed September 14, 2018).

As a result, this report from Harvard University led to make changes to its admissions system from 2014. According to the table above, the number of students admitted with non-white backgrounds is still very small compared to white students (Von Spakovsky, 2018).

## 2.3 University Performance, Graduate Citizens and their Impact on Society

### 2.3.1 Intellectual Society

Cunningham (2006) mentions that it is also expected that the greater the number of educated citizens, the greater financial and psychological benefits created to individuals and governments. Educated people often work in workplaces that have health insurance and retirement benefits under the legal system. As a result, their lives are healthier than those who lack academic education and who work without insurance and retirement benefits. The US government spends between $800 and $200 per person annually on unemployment support budgets such as unemployment insurance, food and health care packages.

### 2.3.2 University Graduates and their Unemployment

Regarding the unemployment of graduates in UK, Clegg (2017) found that recent graduates and non-graduates aged 21 to 30 have both had consistently higher unemployment rates than older graduates and older non-graduates (Figure 4). Therefore, Clegg (2017) concluded that it could be explained by the fact that young people will have been looking for work for a relatively short period of time, may probably lack labour market experience and are less likely to have a clearly-defined career path. When focusing on recent graduates and non-graduates aged 21 to 30, the recent graduate group had consistently lower unemployment rates. This indicates that going on to higher education can help a young person find a job.

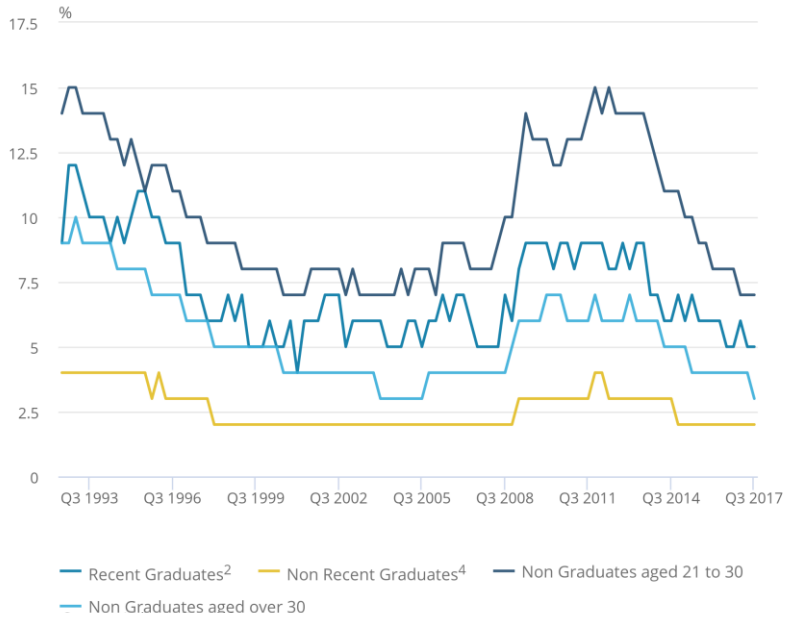


Figure 4: Unemployment rates among University Graduates and Non-Graduates in UK - Clegg (2017)

Ibrahim & Mahyuddin (2017) prepared a comparative analysis about unemployed youth by educational attainment in Malaysia; in this study, the youth labour force tends to be more skewed towards youth with lower educational attainment. Among 15 - 24-

year-olds, only 16% have tertiary educational attainment, while the highest level of schooling attained by the remaining 84% is secondary education (Profile for overall labour force: Tertiary education: 28%; Primary, Secondary, and No formal education: 72%). Notably, youth with tertiary education make up a relatively larger share of unemployed youth (23% of total unemployed youth, Figure 5). Of concern, among those with tertiary educational attainment, the unemployment rate is higher at 15.3% (Youth without tertiary education: 9.8%).

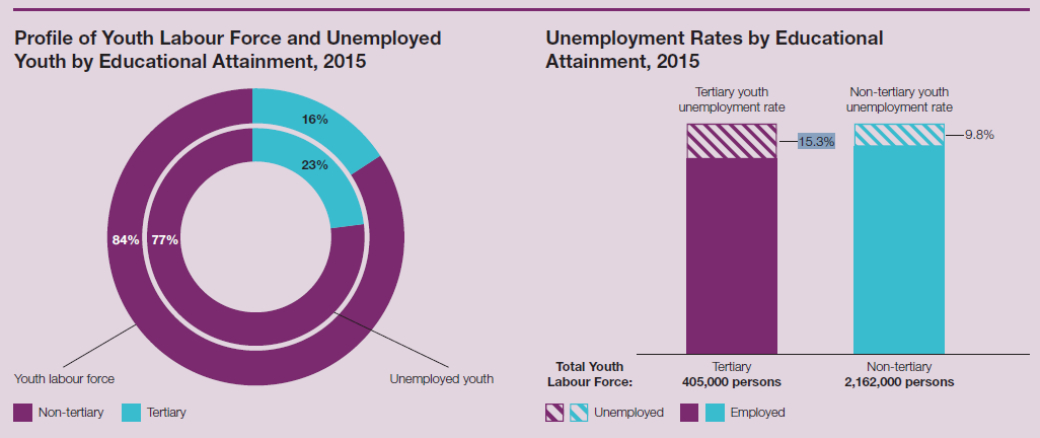


Figure 5: Unemployed Youth by Educational Attainment in Malaysia - Ibrahim & Mahyuddin (2017)

In addition, Ibrahim & Mahyuddin (2017) compared the youth unemployment rates in Malaysia with regional and advanced countries. Among regional countries, unemployment rates for young graduates also tend to be higher than non-graduates (Figure 6). This observation appears to be counter-intuitive to the economic wisdom of increasing returns to educational attainment, and seems to be the opposite of the experience in the advanced economies. These trends are likely to be to the nature of global supply chains and ensuing patterns of job creation in the emerging economies and advanced economies.

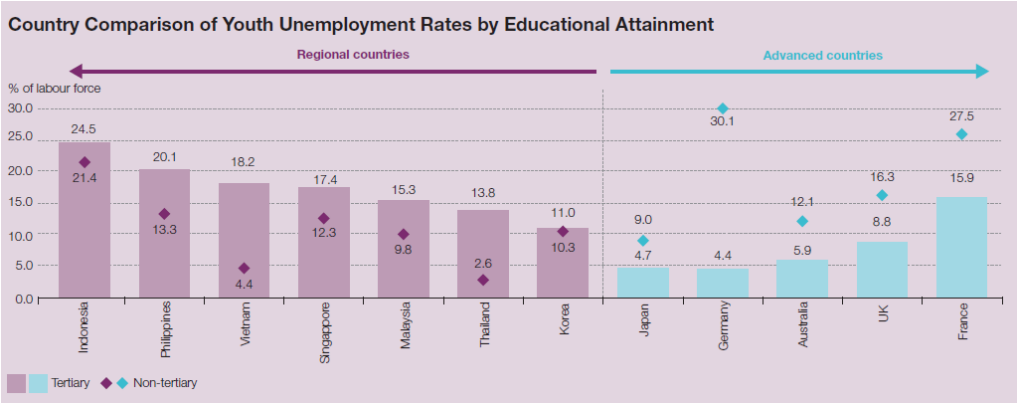


Figure 6: Comparison of Youth Unemployment Rates in Malaysia with regional and Advanced Countries - Ibrahim & Mahyuddin (2017)

### 2.3.3 University Involvement in Patents

Sterzi (2013) stated that science policies have paid special attention for a long time to the most efficient tools for improving the exploitation of knowledge created in universities and public research institutions.

Regarding the participation of universities in patent, Van Dongen, Winnink, & Tijssen (2014) indicated that in Netherlands, 952 patent applications were filed by the nine universities with an average of 9.6 per university per year during the years between 2000 and 2010, with a spread between 0 and 40 patent applications per university per year. The larger amounts of patent applications were filed by either technical universities or general universities with a large faculty of science. A total of 1946 patent applications based upon research at the nine universities (four technical and five general universities) were filed by companies and organizations.

In addition, in 2005, 3.6% of U.S.-owned patents belonged to U.S. universities, compared to only 1.1% in 1991 (Friedman and Silberman 2003; USPTO 2017). Also, regarding universities patents share in United States, Kim (2013) concluded that places like Silicon Valley in California, Route 128 in Boston, the Research Triangle in North

Carolina, and similar areas in San Diego and Texas are leading the way in university technology transfer due to their many close partnerships with government and industry entities.

According to the Roesler, & Broekel, (2017) which is about investigating the role of universities in a network of subsidized Research and Development (R&D) collaboration in biotechnology-industry sector from 2007 to 2010. Apart from 2007 which is presented in Figure 7, universities are the main recipient of joint R&D funding, highlighting their central role in the subsidized biotechnological R&D network in Germany.

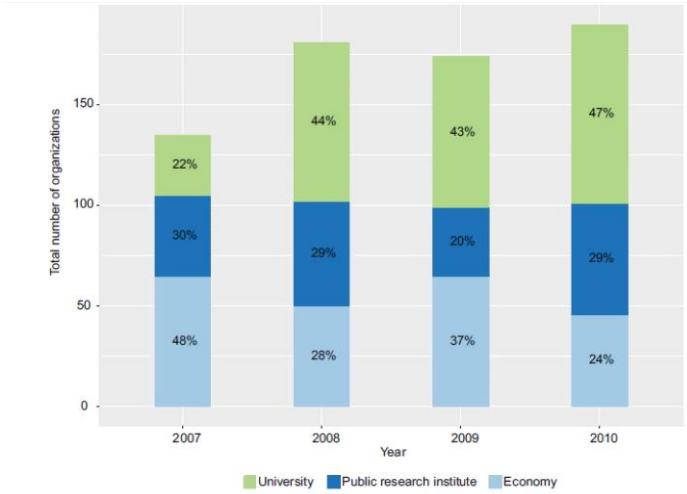


Figure 7: Role of Uuniversities in a Network of Subsidized (R&D) Collaboration in Biotechnology-Industry Sector in Germany - Roesler, & Broekel, (2017)

Moreover, National Survey of Research and Development (R&D) in Malaysia (2017) reported that Intellectual Property (IP) outputs are largely produced by business entities, followed by universities (Figure 8). Based on intellectual properties (Intellectual outputs in this instance refers to patents filed, patents granted, copyrights, trademarks and industrial designs.) registered with the local IP office in 2016, Business

Entities (BE) account for approximately 60 percent of the total IP output, followed by Higher Educational Institutions (HEI) and Public Research Organizations (PRO) that accounted for approximately 31 percent and 8 percent of the total IPs respectively (MASTIC, 2018).

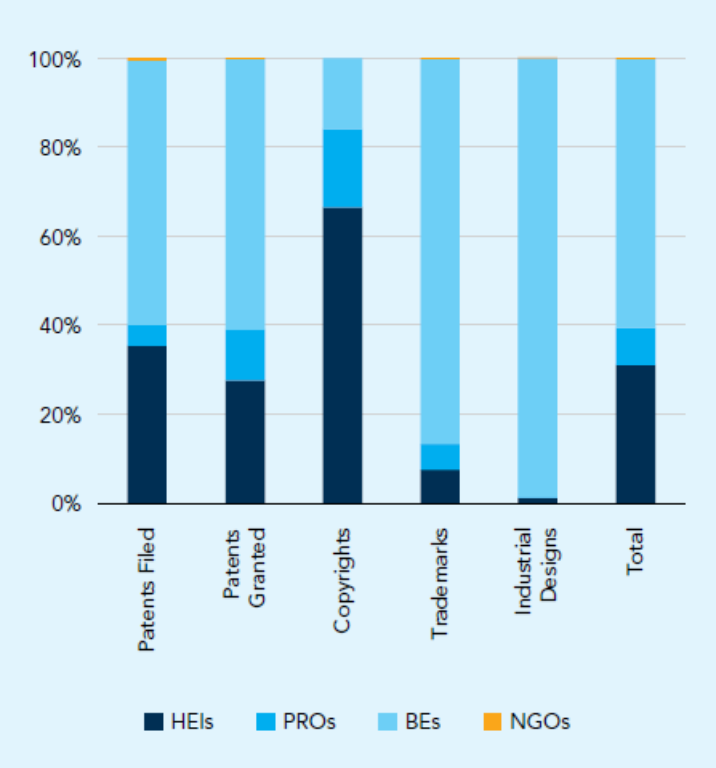


Figure 8: Distribution of intellectual property (IP) outputs in Malaysia - National Survey of Research and Development (R&D) in Malaysia (2017)

## 2.4 Government Contribution to Univeristies

Strehl, Reisinger & Kalatschan (2007) regarding the government contribution to German universities, declared that:

> "The great majority of funding for higher education is provided from public sources. As the institutions of higher education are public institutions of the federal states (Länder), consequently, their current expenditure for research and teaching (salaries, material and operating costs) are being primarily funded through the Länder budgets."

Sayer (2014) illustrated that the most important performance comparison in UK higher education is national research assessment, because of the role of research in determining prestige and monies, and because of the intensity and comprehensive scale of the process. In the 2013–2014, £47 million was spent in universities and £12 million in government administrative costs.

In addition, the report from Organization for Economic Co-operation and Development (OECD) in 2015 stated that in spending on tertiary education institutions, the UK allocates more, but achieves less. The OECD's Education at a Glance finds that, in 2013, the UK allocated 1.8% of GDP in funding of tertiary education, well above the OECD average of 1.5% and ahead of Germany (1.2%), France (1.4%), and Japan (1.5%), though below Korea (2.3%), Canada (2.5%), and the US (2.8%).

About the governmental contribution in United States, Trusts (2019) indicated that although higher education programs account for only about 2 percent of the total federal budget, they make up a large share of federal education investments. For example, just under half of the U.S. Department of Education's budget is devoted to higher education (excluding loan programs). Higher education funding also comes from other federal agencies, such as the National Science Foundation and the departments of Veterans Affairs and Health and Human Services. At the state level, higher education was the third-largest area of general fund spending in 2017 which is presented in Figure 9.

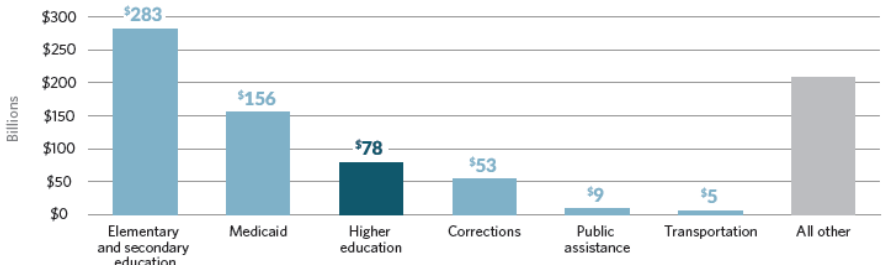


Figure 9: Major Categories of Government Contribution in U.S in 2017 - Trusts (2019)

## 2.5 The Share of Internatinal/Female Students on Patents

According to the National Survey of College Graduates (NSCG) report in 2003 only 5.5% of commercialized patents granted were reported by female inventors; and the reason could be that women are underrepresented in electrical and mechanical engineering, the most patent-intensive fields, and in development and design, the most patent-intensive jobs (Hunt, Garant, Herman & Munroe 2012). Also, Alcantara (2019) reported that the names of female inventors were only listed on 21% of patents granted in 2016, with women making up only 12% of all United States patent inventors that year.

Stewart (2019) reported that the 2017 U.S Federal Budget that was presented included $7 billion for science, technology, engineering, and mathematics (STEM) education initiatives, but made little provision for female-specific programs; Certainly, eliminating or reducing programs related to women can affect the capabilities and statistics of their inventions.

Regarding the impact of international students on patents in US, Chellaraj, Maskus, & Mattoo (2008) stated that:

> "The presence of foreign graduate students has a significant and positive impact on both future patent applications and future patents awarded to university and non-university institutions. Our central estimates suggest that a 10% increase in the number of foreign graduate students would raise patent applications by 4.5%, university patent grants by 6.8% and non-university patent grants by 5.0%."

# Chapter 3

# METHODOLOGY

Although factors influencing the rate of unemployment among graduates and patent creators are numerous, in this thesis, the impact of the contribution of the government to institutions of higher learning on the unemployment of graduates and the relationship between the admission of female and international students to new patents have been selected for study and analysis. In this study, the literature review was conducted and three effective players in the higher education identified.

According to the 2018 report of UNESCO related to the top 20 countries for international students, and avaialability of data, 5 countries have been selected (UNSECO Institute for Statistics, http://data.uis.unesco.org/#). Related to UNESCO report, it has been decided to choose Unites States, UK, Germany, Netherlands and Malaysia as top favorite destinations for international students as the sample of the study.

The purpose of such a choice was to address the proposed research questions, related to universities performance, their adherence to labor market needs of the host countries. Although some international students may be keen to go back to their own countries, the policies of the host countries are established to use educated international students' skills to develop their economy and meet the market needs. This statement have been addressed in the European Union Immigration policy (2012)

which is mentioned in previous chapter. Therefore, the following model has been designed for this thesis:

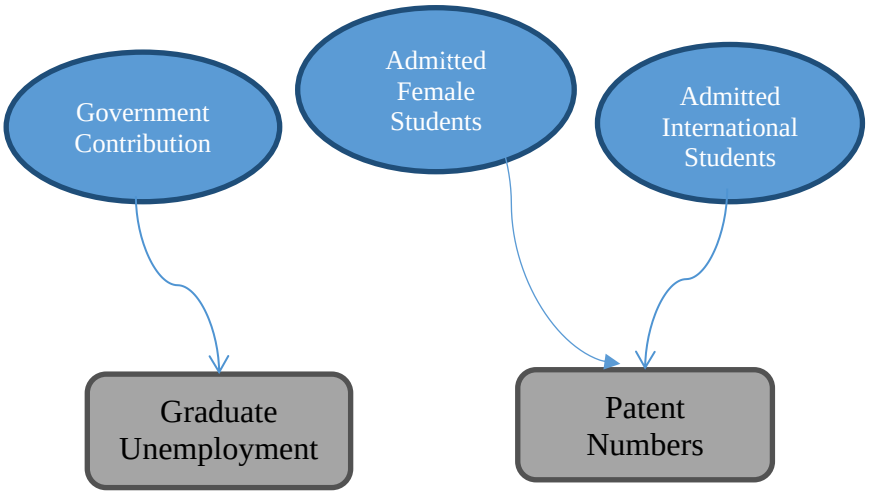


Figure 10: Relationship between Government Contribution and Admission Practices in the direction of Graduate Unemployment Rate & Patent Number

The following equations and hypothesis are defined for aforementioned figure analysis:

$$U_i = C + GC_i + E_i \qquad (1)$$

Graduate Unemployment Rate = U; Graduate Unemployment rate of the society in which universities operate.

Government Contribution = GC;

C = Constant for equation (1)

E = Error Term for equation (1)

$$PN_i = G + AFS_i + AIS_i + e_i \qquad (2)$$

Patent Number= PN;

Admitted Female Students Ratio = AFS;

Admitted International Students Numbers = AIS;

Constant term for equation (2) = G;

Error Term for equation (1) = e.

Hypothesis (1):

Governmental contribution to universities impacts on the unemployment rate among graduates as expressed in equation (1).

Hypothesis (2):

The ratio of admitted female students to the universities impacts on new patent numbers registered as expressed in equation (2).

Hypothesis (3):

The number of international students admitted to the universities imapcts on the number of new patents numbers as expressed in equation (2).

The hypotheses of this thesis are based on the above designed model. Hypothesis No. 1 is in line with labour market needs, through which we seek to reduce the unemployment rate among graduates by increasing government funding.

Hypotheses 2 and 3 are in order to test the relationship between the admission rate of international students and female students with the patent numbers in host countries that universities operate. The available data required for the female students is in ratio, however, other data regarding international students are in exact numbers. The reason that this thesis used female students quantity as ratio scale is lack of proper data continuous years for the selected countries.

# Chapter 4

# DATA ANALYSIS

Given that the availability of studies related to the subject of research and also the possibility of collecting statistical data in any research is crucial, I have tried to select countries that have more up-to-date and reliable data. Another reason for choosing the following countries is that each of them is one of the destinations of academic education from the perspective of international students. According to the set model and hypotheses, following the study of government contribution impact on the unemployment rate of university graduates and also the degree of commitment to the principles applied by higher education between genders and local and international students which leads to promote creativity and innovation.

The general information and reasons for selecting the sample countries are as follows:

## 4.1 Malaysia

Abduh & Dahari (2011) indicated that the language of instruction at most Malaysian universities is English so it is open to international students. Also, the cost of studying in Malaysia is not comparable to the cost of studying in many countries, especially in the fields of medicine, dentistry, and pharmacy, which are among the most expensive and costly fields in the world (Abduh & Dahari, 2011).

One of the most important benefits of studying in Malaysia is that there is no age limit for enrolling and studying at Malaysian universities. From 16 years old to 60 years old, people can fulfill their educational dreams in this country.

Lack of age requirement to study in Malaysia's universities has made the country the cradle of aspirations of many people who have failed to study abroad due to the loss of age requirement and the age of applicants; surely these people can easily study in their favorite field.

It should be noted that it is possible to obtain a visa for travel and residence of spouse and children under 18 years in Malaysia, and the validity of diplomas from Malaysian universities in European countries and the United States is very high.

The possibility of obtaining scholarships and free education in Malaysia is another advantage of studying in this Southeast Asian country, which, of course, is mostly considered for doctoral studies. Of course, postgraduate students who study in a research-oriented manner have the chance to study for free in this country and receive a scholarship.

Malaysian colleges and universities, charities, and industrial companies offer scholarships. Malaysian PhD Students who succeed in obtaining a Malaysian PhD Scholarship also receive plane tickets from the capital of the country of residence to Malaysia and free health insurance.

## 4.2 Netherlands

The Netherlands is a country where most of the population can speak English so that during the study stay, students easily adapt to the people of this country (Admiraal, Westhoff & De Bot, 2006).

Van der Wende (1997) declared that the diploma from this country is the key to professional success around the world. The Dutch higher education system has a global reputation for high quality, and experience shows that people who have studied at a Dutch higher education institution have performed very well in other parts of the.

Study conditions in the Netherlands are suitable for those students who intend to stay with their spouses and children, and these people can use the opportunities which are provided by the government to obtain a visa. Therefore, those international students who are seeking to a bachelor's or master's degree in the Netherlands can easily qualify for this after about 1 to 3 months of their stay in the Netherlands and after registering at a university in this country.

The Netherlands offers facilities for international students who have completed their studies in this country. Since the Netherlands is an older country and has a good labor market in Europe, it needs a skilled workforce with a university degree. Therefore, after completing their studies, international students can stay in the Netherlands for one year and interview with companies and firms in this country. If students sign a contract with the employers in the Netherlands, they can get a residence and work visa from the Dutch government. Study conditions in the Netherlands that provide post-graduate employment opportunities require knowledge of the Dutch language, so they can take advantage of free Dutch language courses during their studies.

## 4.3 United States

USA is one of the countries with the very good colleges and universities with high rankings and bachelor's, master's and doctoral degrees issued by American universities are popular all over the world. The United States also has some of the top and strongest universities in the world, which is why so many people want to immigrate to the United States to study.

Applicants to study in the United States usually drop out due to the high cost of American universities, but students can reduce the cost of their student life and study stay by using the various scholarships offered by the United States. Some US scholarships for international students are funded by the US government, some by private organizations, and some by private institutions or universities themselves.

The benefits of studying in the United States are as follows:

• Student scientific progress and the world's first destination for international students with approximately 1.1 million (for 2019-2020) international students

• Variety of educational situations

• Updated technology

• Research situations

• Flexibility of the educational system

• Support services for international students

• Global education and career prospects - long-term career

• Experience living in a university environment

•Language learning

• Ability to receive grants.

## 4.4 UK

Studying in the UK brings many people from all over the world to the country for a variety of reasons.

Studying in the UK is one way to immigrate to the UK and study in this country. Studying in schools in this country has always been in great demand and is one of the best options for studying in Europe as there is no need to learn a language other than English. Studying in colleges, high schools and universities in the UK is one of the main ways to get a residency in the UK (Hemsley-Brown, Melewar, Nguyen, & Wilson, 2016).

Moreover, Hemsley-Brown et al (2016) illustrated the benefits of studying in the UK include a professional study environment, improved English skills, good job opportunities, travel opportunities and broadened horizons.

## 4.5 Germany

Beier, Niehoff, Ziems, & Xue (2017) stated that over the decades, Germany has been a major player in many of the world's greatest achievements in the arts and sciences, and hence Germany's role in every field of study, historical tradition and prominence in international forums. In addition, the tuition fees across Germany have been always low; therefore, it has helped local and international students to choose this country as one of the ideal destinations to start their studies (Zavlin, Jubbal, K, Noé, & Gansbacher, 2017).

In order to examine the 3 hypothesis, 5 data categories including government contribution, graduates unemployment rate, ratio of female students, number of

international students and patents numbers of sample countries gathered and analysed based on regression analysis.

## 4.6 Netherlands - Government Contribution and University Graduate Unemployment Rate

The collected data regarding universities financial information and unemployment in the country are as follow:

Table 5: Government Contribution and University Graduate Unemployment Rate in Netherlands*

| Netherlands | | |
|---|---|---|
| Year | University Graduate Unemployment Rate (%) | Government Contribution (%) |
| 2000 | 1.71 | 4.59 |
| 2001 | 1.59 | 4.70 |
| 2002 | 1.73 | 4.81 |
| 2003 | 2.37 | 5.04 |
| 2004 | 2.84 | 5.06 |
| 2005 | 3.54 | 5.11 |
| 2006 | 2.90 | 5.04 |
| 2007 | 2.39 | 4.89 |
| 2008 | 2.14 | 5.03 |
| 2009 | 2.76 | 5.43 |
| 2010 | 3.09 | 5.49 |
| 2011 | 3.13 | 5.46 |
| 2012 | 3.40 | 5.41 |
| 2013 | 4.17 | 5.53 |
| 2014 | 4.05 | 5.46 |
| 2015 | 3.86 | 5.35 |
| 2016 | 3.51 | 5.48 |

1)(*Government Expenditure on Education, Total (% of GDP) | The World Bank Data*, 2020);
2)(*Unemployment with Advanced Education (% of Total Labor Force with Advanced Education)| The World Bank Data*, 2020).

The Regression analysis is as follows:

Table 6: Model Summary of Government Contribution and University Graduate Unemployment Rate in Netherlands

**Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .849[a] | .720 | .702 | .44492 |

a.Predictors: (Constant), GovexpUni

Table 7: ANOVA of Government Contribution and University Graduate Unemployment Rate in Netherlands

**ANOVA[a]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 7.644 | 1 | 7.644 | 38.613 | .000[b] |
| | Residual | 2.969 | 15 | .198 | | |
| | Total | 10.613 | 16 | | | |

a. Dependent Variable: Unemloy
b. Predictors: (Constant), GovexpUni

Table 8: Coefficients of Government Contribution and University Graduate Unemployment Rate in Netherlands

**Coefficients[a]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | | |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | t | Sig. |
| 1 | (Constant) | -8.791 | 1.884 | | -4.667 | .000 |
| | GovexpUni | 2.261 | .364 | .849 | 6.214 | .000 |

a. Dependent Variable: Unemloy

The ANOVA significancy is almost 0.000 which means the model is OK; the R Square is indicates that 72% of the dependent variable (Graduate unemployment Rate) can be explained by independent variable (Government Contribution).

The Coefficients significance is 0.000 which means that the two variables are related with each other most of the time. There is a high correlation between the two variables;

by considering the Standardized Coefficients, by increasing 1 unit (1 Euro) of independent variable (Government Contribution) the dependent variable (Graduate unemployment Rate) will increase on amount of 84.9%. The dependent variable grows by 84% per unit increase of the independent variable. The correlation is positive so as government contribution increases, the unemployment rate will increase. This strong positive correlation shows that there is more university graduates than demanded in the job market in Netherlands. There is a mismatch between the university education and employment needs in the country.

Statistics show that in 17 years, government contribution to universities has grown by less than one percent, but the unemployment rate among the graduates has been doubled. It is concluded that the need of the labor market for educated people has almost been met and with the increase in the number of people with university degrees, unemployment increases as well. It means there is a high unemployment among the students. there is not enough suitable job opportunity for them. Due to the geographical size of this country and the potential to increase the number of companies, factories and business centers, the need for university graduates is limited and is not increasing every year.

In addition, Citizens of the European Union and the Nordic countries will not need a residence permit to study and work in the Netherlands. According to the latest rules of the Dutch Immigration Service for students in 2020, the number of student working hours is 16 hours per week, which has recently increased to 12 hours before. Students without specialization can complete 16 hours per week through service work. The amount of student income per hour for part-time work varies between € 9 and € 11 (https://malekpourlaw.com/). The amount of salary depends entirely on the employer

and the type of hard work. Thus, the employment of lower-paid students has made it difficult for graduates to find work that is relevant to their field of study. For this reason, with the increase of government budgets, the possibility of education is provided for more people, but in the labour market, there is no space to attract this group of people to the labor market.

Also, it should be noted, the immigration of the workforce from Eastern Europe to Western Europe especially to the UK, Netherlands and Germany, has led to the increasing unemployment rate particularly among graduates (Bite, Szombathelyi, & Vasa, 2020).

## 4.7 USA - Government Contribution and University Graduate Unemployment Rate

The gathered data are as follow:

Table 9: Government Contribution and University Graduate Unemployment Rate in USA*

| USA | | |
|---|---|---|
| Year | University Graduate Unemployment Rate (%) | Government Contribution (%) |
| 2000 | 1.93 | 6.31 |
| 2001 | 2.56 | 6.64 |
| 2002 | 3.33 | 6.86 |
| 2003 | 3.46 | 6.91 |
| 2004 | 3.1 | 6.76 |
| 2005 | 2.71 | 6.69 |
| 2006 | 2.43 | 6.68 |
| 2007 | 2.42 | 6.8 |
| 2008 | 3.01 | 7.17 |
| 2009 | 5.34 | 7.56 |
| 2010 | 5.47 | 7.36 |

| | | |
|---|---|---|
| 2011 | 5.14 | 7.25 |
| 2012 | 4.74 | 7.04 |
| 2013 | 4.32 | 6.92 |
| 2014 | 3.69 | 6.88 |
| 2015 | 3.03 | 6.85 |

1) (*Government Expenditure on Education, Total (% of GDP) | The World Bank Data*, 2020);
2) (*Unemployment with Advanced Education (% of Total Labor Force with AdvancedEducation) | The World Bank Data*, 2020).

The Regression analysis is as follows:

Table 10: Model Summary of Government Contribution and University Graduate Unemployment Rate in USA

**Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .871[a] | .759 | .742 | .57325 |

a. Predictors: (Constant), GovexpUni

Table 11: ANOVA of Government Contribution and University Graduate Unemployment Rate in USA

**ANOVA[a]**

| Model | | Sum of Squares | Df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 14.491 | 1 | 14.491 | 44.097 | .000[b] |
| | Residual | 4.601 | 14 | .329 | | |
| | Total | 19.092 | 15 | | | |

a. Dependent Variable: Unemloy
b. Predictors: (Constant), GovexpUni

Table 12: Coefficients of Government Contribution and University Graduate Unemployment Rate in USA

**Coefficients[a]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | | |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | t | Sig. |
| 1 | (Constant) | -18.807 | 3.369 | | -5.583 | .000 |
| | GovexpUni | 3.231 | .487 | .871 | 6.641 | .000 |

a. Dependent Variable: Unemloy

The ANOVA significancy is almost 0.000 which means the model is OK; the R Square is high and it shows that government expenditures on college education explains most of the (Graduate unemployment Rate) from universities in USA.

It indicates that 74.2% of the dependent variable (Graduate unemployment Rate) can be explained by independent variable (Government Contribution).

The Coefficients significancy is almost 0.000 that means there a very high correlation between the variables; by considering the Standardized Coefficients, by increasing 1 unit (1 USD) of independent variable (Government Contribution) the dependent variable (Graduate unemployment Rate) will increase on amount of 87.1%. It indicates that there is a positive correlation among the determined variables. The dependent variable grows by 87.1% per unit increase of the independent variable. This indicates the high impact of the independent variable on the dependent variable.

As in the Netherlands, US data show that there is excess supply of university graduatesin the US labor market. As a result, this information shows that the need of the labor market for people with university degrees has almost been met, and if the

number of these people in society increases, the work environment will not be able to recruit all of them.

The United States is a major destination for labour migration around the world, and thousands of people from around the world migrate to work and live in the United States each year, including educated and experienced workforces (McAuliffe, & Ruhs, 2017).

The fact of the matter is that the United States is a country with a free and competitive economy. This competition can be seen in all fields, including business and finding a job, and winner is the person that is able to attract the attention of employers. Employment agencies also seek to introduce foreigners who are willing to work for the lowest pay to companies and earn more commissions (www. https://iliadint.com). Thus, the presence of cheap foreign labor, the strategies of employment agencies has led to upsetting the balance of labor market needs of people educated in American universities. As government contribution increases, so do education facilities, but the labor market is not able to employ these graduates. As the number of young people with college degree increases, unemployment rate increases significantly.

In addition, Cafruny (2019) declared that by transferring the factories, assembly lines overseas in order to reduce the production cost, the United States faced a rising unemployment rate.

## 4.8 Malaysia - Government Contribution and University Graduate Unemployment Rate

The gathered data are as follow:

Table 13: Government Contribution and University Graduate Unemployment Rate in Malaysia*

| Malaysia | | |
|---|---|---|
| Year | University Graduate Unemployment Rate (%) | Government Contribution (%) |
| 2006 | 4.20 | 4.49 |
| 2007 | 4.15 | 4.37 |
| 2008 | 3.92 | 3.96 |
| 2009 | 3.29 | 5.97 |
| 2010 | 3.23 | 4.97 |
| 2011 | 3.38 | 5.76 |
| 2012 | 3.21 | 5.74 |
| 2013 | 3.20 | 5.48 |
| 2014 | 3.22 | 5.21 |
| 2015 | 3.58 | 4.97 |
| 2016 | 4.05 | 4.82 |

1) (*Government Expenditure on Education, Total (% of GDP) | The World Bank Data*,2020);
2) (*Unemployment with Advanced Education (% of Total Labor Force with AdvancedEducation) | The World Bank Data*, 2020).

The Regression analysis is as follows:

Table 14: Model Summary of Government Contribution and University Graduate Unemployment Rate in Malaysia

**Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .787[a] | .620 | .578 | .26704 |

a. Predictors: (Constant), GovexpUni

Table 15: ANOVA of Government Contribution and University Graduate Unemployment Rate in Malaysia

**ANOVA[a]**

| Model | | Sum of Squares | Df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 1.047 | 1 | 1.047 | 14.683 | .004[b] |
| | Residual | .642 | 9 | .071 | | |
| | Total | 1.689 | 10 | | | |

a. Dependent Variable: Unemloy
b. Predictors: (Constant), GovexpUni

Table 16: Coefficients of Government Contribution and University Graduate Unemployment Rate in Malaysia

**Coefficients[a]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 6.152 | .675 | | 9.115 | .000 |
| | GovexpUni | -.507 | .132 | -.787 | -3.832 | .004 |

a. Dependent Variable: Unemloy

The ANOVA significancy is 0.004 which is less than 0.05 that means the model is OK; the R Square is indicates that 76.2% of the dependent variable (Graduate unemployment Rate) can be explained by independent variable (Government Contribution).

The Coefficients significancy is 0.000 that means there is significant affect; the significancy is negative and it shows that one more people graduates from universities, unemployment rate will fall significancy. It means that the labor market in Malaysia needs more university graduates.

By considering the Standardized Coefficients, by increasing 1 unit ( 1 Ringgit ) of independent variable (Government Contribution) the dependent variable (Graduate unemployment Rate) will decrease on amount of 78.7%. This rate indicates the extent

to which the dependent variable is affected by the independent variable. This indicates the high impact of the independent variable on the dependent variable.

Government support, especially from a financial point of view, allows more people to study. The higher the output of universities, the better the labor market needs are met. This indicator shows the strong need of the labor market for educated people.

The negative relationship between the increase in government budget for academics and the unemployment rate of graduates shows that if the government can provide better and more useful support to higher education institutions, the output of universities can play an effective role in reducing the unemployment rate. Malaysia has sought to grow in automotive, construction, electronics and solar panels. Therefore, the need of the labor market for university educated people is increasing.

## 4.9 UK - Government Contribution and University Graduate Unemployment Rate

The gathered data are as follow:

Table 17: Government Contribution and University Graduate Unemployment Rate in UK*

| United Kingdom | | |
|---|---|---|
| Year | University Graduate Unemployment Rate (%) | Government Contribution (%) |
| 2000 | 2.452 | 4.06533 |
| 2001 | 2.2103 | 4.14309 |
| 2002 | 2.6138 | 4.68009 |
| 2003 | 2.5137 | 4.83572 |
| 2004 | 2.3546 | 4.76009 |
| 2005 | 2.5559 | 4.96651 |
| 2006 | 2.7388 | 5.01231 |
| 2007 | 2.5277 | 4.94507 |
| 2008 | 2.8021 | 4.91991 |
| 2009 | 3.963 | 5.10687 |
| 2010 | 4.0554 | 5.74164 |
| 2011 | 4.3106 | 5.6462 |
| 2012 | 4.2858 | - |
| 2013 | 3.9323 | 5.58823 |
| 2014 | 3.1702 | 5.66499 |
| 2015 | 2.9427 | 5.60939 |
| 2016 | 2.9195 | 5.48697 |

1) (*Government Expenditure on Education, Total (% of GDP) | The World Bank Data*, 2020);
2) (*Unemployment with Advanced Education (% of Total Labor Force with Advanced Education)| The World Bank Data*, 2020).

The conducted regression analysis results are:

Table 18: Model Summary of Government Contribution and University Graduate Unemployment Rate in UK

**Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .736[a] | .541 | .508 | .47628 |

a. Predictors: (Constant), GovexpUni

Table 19: ANOVA of Government Contribution and University Graduate Unemployment Rate in UK

**ANOVA[a]**

| Model | | Sum of Squares | Df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 3.745 | 1 | 3.745 | 16.508 | .001[b] |
| | Residual | 3.176 | 14 | .227 | | |
| | Total | 6.920 | 15 | | | |

a. Dependent Variable: Unemloy
b. Predictors: (Constant), GovexpUni

Table 20: Coefficients of Government Contribution and University Graduate Unemployment Rate in UK

**Coefficients[a]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | | |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | t | Sig. |
| 1 | (Constant) | -1.847 | 1.200 | | -1.540 | .146 |
| | GovexpUni | .956 | .235 | .736 | 4.063 | .001 |

a. Dependent Variable: Unemloy

The ANOVA significancy is 0.001 that is less than 0.05 which means the model is OK; the R Square is indicates that 54.1% of the dependent variable (Graduate unemployment Rate) can be explained by independent variable (Government Contribution).

The Coefficients significancy is less than 0.05 that means there is significant affect by 0.001 weight; by considering the Standardized Coefficients, by increasing 1 unit (1

Pound sterling) of independent variable (Government Contribution) the dependent variable (Graduate unemployment Rate) will increase on amount of 73.6%. There is a positive correlation which indicates a mismatch between the needs of the labor market and government contribution.

Like other developed countries in the economic and technological fields, statistical data from the UK show that the labor market meets the needs of educated people, and if the number of these people increases, their unemployment rate will increase.

Interestingly, a small part of the British workforce is in the agricultural and textile sectors. However, due to the use of the latest technologies in this sector, in addition to meeting domestic needs, some of these products are exported abroad. For this reason, using the high level of technological infrastructure, the needs of the labor market in the UK are more in need of technicians and workers than university educated labor or maybe no more labor (Lewis, 2020).

## 4.10 Germany - Government Contribution and University Graduate Unemployment Rate

The gathered data are as follow:

Table 21: Government Contribution and University Graduate Unemployment Rate in Germany*

| Germany | | |
|---|---|---|
| Year | University Graduate Unemployment Rate (%) | Government Contribution (%) |
| 2006 | 4.79 | 4.28 |
| 2007 | 3.82 | 4.34 |
| 2008 | 3.31 | 4.41 |
| 2009 | 3.39 | 4.88 |
| 2010 | 3.02 | 4.91 |
| 2011 | 2.37 | 4.81 |
| 2012 | 2.31 | 4.93 |
| 2013 | 2.35 | 4.93 |
| 2014 | 2.47 | 4.92 |
| 2015 | 2.32 | 4.81 |
| 2016 | 2.19 | 4.80 |

1) (*Government Expenditure on Education, Total (% of GDP) | The World Bank Data*, 2020);
2) (*Unemployment with Advanced Education (% of Total Labor Force with Advanced Education)| The World Bank Data*, 2020).

The conducted regression analysis results are:

Table 22: Model Summary of Government Contribution and University Graduate Unemployment Rate in Germany

**Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .808[a] | .652 | .614 | .51224 |

a. Predictors: (Constant), GovexpUni

Table 23: ANOVA of Government Contribution and University Graduate Unemployment Rate in Germany

**ANOVA[a]**

| Model | | Sum of Squares | Df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 4.431 | 1 | 4.431 | 16.886 | .003[b] |
| | Residual | 2.361 | 9 | .262 | | |
| | Total | 6.792 | 10 | | | |

a. Dependent Variable: Unemloy
b. Predictors: (Constant), GovexpUni

Table 24: Coefficients of Government Contribution and University Graduate Unemployment Rate in Germany

**Coefficients[a]**

| | | Unstandardized Coefficients | | Standardized Coefficients | | |
|---|---|---|---|---|---|---|
| Model | | B | Std. Error | Beta | t | Sig. |
| 1 | (Constant) | 15.304 | 3.013 | | 5.080 | .001 |
| | GovexpUni | -2.614 | .636 | -.808 | -4.109 | .003 |

a. Dependent Variable: Unemloy

The ANOVA significancy is 0.003 that is less than 0.05 which means the model is OK; the R Square is indicates that 65.2% of the dependent variable (Graduate unemployment Rate) can be explained by independent variable (Government Contribution).

The Coefficients significancy is 0.001 which is less than 0.05 that means there is significant affect; by considering the Standardized Coefficients, by increasing 1 unit (1 Euro) of independent variable (Government Contribution) the dependent variable (Graduate unemployment Rate) will decrease on amount of 80.8%.This indicates the high impact of the independent variable on the dependent variable.

Germany requires meeting the need of the working environments for academically educated workforce (Schenkenhofer, & Wilhelm, 2020). Therefore, with the increase in the number of university graduates, the labor market will be able to attract all these people, and as a result, the unemployment rate of these people decreases.

As one of the immigration agencies called Awatlaw (2019) stated that German-made products are in high demand, especially in the chemical, automotive, machinery and medical equipment industries. Germany's main trading partners, specially in Western Europe, are France, Italy and the United Kingdom, as the United States, China, Japan and Russia. Therefore, some production and business activities of German industries take place outside this country. according to the list of required jobs announced by the German government in 2020, most of the labor market needs are educated people, such as metal construction, welding and joining technology, mechatronics professions, technology professions, construction electronics professions, electrical machine professions, electrical-industrial engineering professions, software, programming, specialist nursing professions, surgical technology and medical technical assistance professions (www.https://awatlaw.com).

As a result, the market needs for educated people are increasing every year, and as the number of this group of people grows, so their unemployment rate is decreasing.

## 4.11 Netherlands - Patent Number and International & Female Students Number

The gathered data are as follow:

Table 25: Patent Number and International & Female Students Number in Netherlands*

| Netherlands | | | |
|---|---|---|---|
| Year | Female student Ratio (%) | Inbound International amount (number) | Patent Quantity (Number) |
| 2008 | 79.425 | 60198 | 2732 |
| 2009 | 79.658 | 61947 | 2854 |
| 2010 | 79.891 | 63696 | 2767 |
| 2011 | 80.124 | 65445 | 2895 |
| 2012 | 80.357 | 67194 | 2713 |
| 2013 | 80.59 | 68943 | 2764 |
| 2014 | 87.6886 | 70692 | 2582 |
| 2015 | 86.1271 | 86189 | 2494 |
| 2016 | 85.3463 | 89920 | 2604 |
| 2017 | 90.9199 | 96289 | 2606 |
| 2018 | 92.2572 | 104582.6 | 2505 |

1) (*School Enrollment, Tertiary, Female (% Gross) | The World Bank Data*, 2020);
2) Uis. (2020). UIS Statistics. Retrieved from http://data.uis.unesco.org/.

The conducted regression analysis results for both dependent variables are:

Table 26: Model Summary of Patent Number and International & Female Students Number in Netherlands

**Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .837[a] | .700 | .625 | 82.335 |

a. Predictors: (Constant), FemaleStudRatio, ForeignStudent

Table 27: ANOVA of Patent Number and International & Female Students Number in Netherlands

**ANOVA[a]**

| Model | | Sum of Squares | Df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 126646.406 | 2 | 63323.203 | 9.341 | .008[b] |
| | Residual | 54231.776 | 8 | 6778.972 | | |
| | Total | 180878.182 | 10 | | | |

a. Dependent Variable: PatentQuant
b. Predictors: (Constant), FemaleStudRatio, ForeignStudent

Table 28: Coefficients of Patent Number and International & Female Students Number in Netherlands

**Coefficients[a]**

| | | Unstandardized Coefficients | | Standardized Coefficients | | |
|---|---|---|---|---|---|---|
| Model | | B | Std. Error | Beta | t | Sig. |
| 1 | (Constant) | 4363.163 | 820.450 | | 5.318 | .001 |
| | ForeignStudent | -.002 | .004 | -.184 | -.394 | .704 |
| | FemaleStudRatio | -18.588 | 12.996 | -.666 | -1.430 | .191 |

a. Dependent Variable: PatentQuant

The Coefficients sig. is greater than 0.05 that means there is not a significant affect; it shows that the gender nor nationality are not affecting patent numbers.

According to the report generated Global Innovation Index (GII) in 2019, the Netherlands ranks 4th with the U.K. moving into 5th position; the long-standing Dutch tradition of entrepreneurship, creativity, openness and collaboration is appropriate for

advanced materials and systems. These features make the country an ideal place to seek solutions to contemporary societal challenges in the areas of health, wellness, renewable energy, security, climate and mobility. These challenges are very complex and these solutions are mainly found through achievements in collaboration and technology. The key to success in this complex and intense sector is to compete actively and innovate throughout the value chain and create an effective network (or ecosystem) of institutions and companies (Dutta, Lanvin, & Wunsch-Vincent, 2017).

According to Thelen, (2019), most Dutch innovations are related to information technology and enable key developments in many areas, such as water management, the production of ornamental plants and food, and the automotive industry. Dutta, et al (2017) indicated that a significant number of public-private partnerships between the Dutch government and the private and educational sectors have led to active development in various areas of embedded systems, modeling, multimedia technologies, and virtual laboratories and computing.

The key to innovation is elitism (Kamoche, & Leigh, 2021). Industrial centers have become research environments which train their educated workforce. By selecting academic elites and improving them in the workplace, they have been able to succeed in this field. Therefore, with the increase in the number of female students or international students, it is not guaranteed the rate of innovation to increase.

## 4.12 USA - Patent Number and International & Female Students Number

The gathered data are as follow:

Table 29: Patent Number and International & Female Students Number in USA*

| United States | | | |
|---|---|---|---|
| Year | Female student Ratio (%) | Inbound International amount (number) | Patent Quantity (Number) |
| 2008 | 112.196 | 580090.4 | 456321 |
| 2009 | 110.906 | 633087.9 | 456106 |
| 2010 | 109.616 | 686085.4 | 490226 |
| 2011 | 109.498 | 739082.9 | 503582 |
| 2012 | 108.938 | 792080.4 | 542815 |
| 2013 | 103.113 | 784427 | 571612 |
| 2014 | 102.599 | 842384 | 578802 |
| 2015 | 102.747 | 907251 | 589410 |
| 2016 | 102.294 | 971417 | 605571 |
| 2017 | 102.011 | 984898 | 606956 |
| 2018 | 99.2982 | 1057067.9 | 597141 |

1) (*School Enrollment, Tertiary, Female (% Gross)* | *The World Bank Data*, 2020);
2) Uis. (2020). UIS Statistics. Retrieved from http://data.uis.unesco.org/.

The conducted regression analysis results for both dependent variables are:

Table 30: Model Summary of Patent Number and International & Female Students Number in USA

**Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .960[a] | .922 | .902 | 18388.249 |

a. Predictors: (Constant), FemaleStudRatio, ForeignStudent

Table 31: ANOVA of Patent Number and International & Female Students Number in USA

**ANOVA[a]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 31829459828.708 | 2 | 15914729914.354 | 47.067 | .000[b] |
| | Residual | 2705021655.292 | 8 | 338127706.912 | | |
| | Total | 34534481484.000 | 10 | | | |

a. Dependent Variable: PatentQuant
b. Predictors: (Constant), FemaleStudRatio, ForeignStudent

Table 32: Coefficients of Patent Number and International & Female Students Number in USA

**Coefficients[a]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | | |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | t | Sig. |
| 1 | (Constant) | 1176683.611 | 437282.575 | | 2.691 | .027 |
| | ForeignStudent | .164 | .100 | .427 | 1.641 | .140 |
| | FemaleStudRatio | -7237.157 | 3410.385 | -.552 | -2.122 | .067 |

a. Dependent Variable: PatentQuant

The ANOVA significancy is 0.000 that is less than 0.05 which means the model is OK; the R Square is indicates that 70% of the dependent variable (Patent Numbers) can be explained by independent variables (Admitted Female Students) and (Admitted International Students).

The Coefficients significancy for gender discrimination is very close to 0.05 that means there is a slight affect; by considering the Standardized Coefficients, by

increasing 1 unit of variables (Admitted Female Students) the dependent variable (Patent Numbers) will decrease on amount of 55.2%. Thus, the negative correlation between the female students' number and patent number can be explained. There is no correlation between foreign students and patents in US and there is a negative correlation between female admittance and patents and innovations.

The center of American innovation is industry and business. The country's knowledge-based companies have largely become a science production center themselves. They have been able to become the scientific hub of the world by attracting smart and expert people from all over the world. Therefore, data analysis indicates that with the increase in the number of international educated people, it is possible to increase the amount of innovation and inventions, but the gender of these students is not an affecting factor in changing the patent rate.

There are many factors that give women the opportunity to become an inventor; But according to Olmos-Gómez., Luque-Suárez, Becerril-Ruiz, & Cuevas-Rincón, (2021), the choice of "field of study" and "career path" can be considered two very important factors in this regard. Naturally, the fewer women seek practical and engineering careers, the fewer shares they will receive from the grant patents. The problems and challenges associated with financing and the lack of communication networks (which can play a vital role in patenting and commercializing innovations) make more difficulties for women than men. Therefore, an increase in the number of educated women in the United States does not indicate an increase in the number of patents.

## 4.13 Malaysia - Patent Number and International & Female Students Number

The gathered data are as follow:

Table 33: Patent Number and International & Female Students Number in Malaysia*

| Malaysia | | | |
|---|---|---|---|
| Year | Female student Ratio (%) | Inbound International amount (number) | Patent Quantity (Number) |
| 2008 | 39.05205036 | 83224.8 | 5303 |
| 2009 | 40.24607607 | 86792 | 5737 |
| 2010 | 41.44010179 | 90359.2 | 6383 |
| 2011 | 41.41298 | 93926.4 | 6452 |
| 2012 | 43.28743 | 97493.6 | 6940 |
| 2013 | 45.21575 | 101060.8 | 7205 |
| 2014 | 45.43081 | 99648 | 7620 |
| 2015 | 51.66175 | 111443 | 7727 |
| 2016 | 50.57597 | 124133 | 7236 |
| 2017 | 47.06639 | 100765 | 7072 |
| 2018 | 49.85466 | 122823 | 7295 |

1) (*School Enrollment, Tertiary, Female (% Gross) | The World Bank Data*, 2020);
2) Uis. (2020). UIS Statistics. Retrieved from http://data.uis.unesco.org/.

The conducted regression analysis results for both dependent variables are:

Table 34: Model Summary of Patent Number and International & Female Students Number in Malaysia

**Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .858[a] | .736 | .671 | 440.383 |

a. Predictors: (Constant), FemaleStudRatio, ForeignStudent

Table 35: ANOVA of Patent Number and International & Female Students Number in Malaysia

**ANOVA[a]**

| Model | | Sum of Squares | Df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 4336306.831 | 2 | 2168153.415 | 11.180 | .005[b] |
| | Residual | 1551495.897 | 8 | 193936.987 | | |
| | Total | 5887802.727 | 10 | | | |

a. Dependent Variable: PatentQuant
b. Predictors: (Constant), FemaleStudRatio, ForeignStudent

Table 36: Coefficients of Patent Number and International & Female Students Number in Malaysia

**Coefficients[a]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | | |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | T | Sig. |
| 1 | (Constant) | -416.624 | 1648.371 | | -.253 | .807 |
| | ForeignStudent | -.017 | .028 | -.303 | -.615 | .556 |
| | FemaleStudRatio | 199.309 | 86.669 | 1.132 | 2.300 | .050 |

a. Dependent Variable: PatentQuant

The ANOVA significancy is less than 0.05 which means the model is OK; the R Square is indicates that 70% of the dependent variable (Patent Numbers) can be explained by independent variables (Admitted Female Students) and (Admitted International Students).

The Coefficients significancy is 0.05 that means there is a significant affect; by considering the Standardized Coefficients, by increasing 1 unit of variables (Admitted Female Students) the dependent variable (Patent Numbers) will increase by an amount of 1.132. So, there is a positive correlation among the female students' number and patent number and obviously, the female students are contributing to innovations in Malaysia.

After the independence of Malaysia, very important changes took place in the development of products in the electronics and electrical equipment sector: the added value of the Malaysian industry increased from 19% of GDP to 40% in 2014. In the 2015 Bloomberg ranking based on six indicators, Malaysia was ranked 27th among the 50 most innovative countries in the world and first among Muslim countries (www.bloomberg.com).

According to the Ramayah, Soto-Acosta, Kheng, & Mahmud (2020), Competitiveness and market structure are central to innovation, and competitiveness encourages companies to invest in innovation to gain market share and market sustainability. Competitive conditions in Malaysia are not entirely equal, and this is quite evident between the market and industry, and this reduces competition for innovation in Malaysia.

Based on the statistically analyzed data, it is concluded that by encouraging and supporting the presence of more women in the university community, we will lead to a significant growth in the rate of innovation and inventions. But the student nationality factor cannot impact on increasing the number of patents.

## 4.14 UK - Patent Number and International & Female Students Number

The gathered data are as follow:

Table 37: Patent Number and International & Female Students Number in UK*

| United Kingdom | | | |
|---|---|---|---|
| Year | Female student Ratio (%) | Inbound International amount (number) | Patent Quantity (Number) |
| 2008 | 65.758 | 399845.7 | 23379 |
| 2009 | 65.8987 | 403981.6 | 22465 |
| 2010 | 66.0395 | 408117.5 | 21929 |
| 2011 | 67.4965 | 412253.4 | 22259 |
| 2012 | 67.8672 | 416389.3 | 23235 |
| 2013 | 65.0842 | 416693 | 22938 |
| 2014 | 64.5047 | 428724 | 23040 |
| 2015 | 64.6598 | 430833 | 22801 |
| 2016 | 67.2257 | 432001 | 22059 |
| 2017 | 69.3793 | 435734 | 22072 |
| 2018 | 67.1655 | 441204.7 | 20941 |

1) (*School Enrollment, Tertiary, Female (% Gross)* | *The World Bank Data*, 2020);
2) Uis. (2020). UIS Statistics. Retrieved from http://data.uis.unesco.org/.

The conducted regression analysis results for both dependent variables are:

Table 38: Model Summary of Patent Number and International & Female Students Number in UK

**Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .584[a] | .341 | .177 | 645.946 |

a. Predictors: (Constant), FemaleStudRatio, ForeignStudent

Table 39: ANOVA of Patent Number and International & Female Students Number in UK

**ANOVA[a]**

| Model | | Sum of Squares | Df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 1729164.128 | 2 | 864582.064 | 2.072 | .188[b] |
| | Residual | 3337974.054 | 8 | 417246.757 | | |
| | Total | 5067138.182 | 10 | | | |

a. Dependent Variable: PatentQuant
b. Predictors: (Constant), FemaleStudRatio, ForeignStudent

Table 40: Coefficients of Patent Number and International & Female Students Number in UK

**Coefficients[a]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | | |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | t | Sig. |
| 1 | (Constant) | 41330.144 | 9891.049 | | 4.179 | .003 |
| | ForeignStudent | -.022 | .015 | -.423 | -1.427 | .192 |
| | FemaleStudRatio | -146.212 | 140.508 | -.309 | -1.041 | .328 |

a. Dependent Variable: PatentQuant

The ANOVA significancy is greater than 0.05 which means that the independent variables (Admitted Female Students) and (Admitted International Students) do not affect on the dependent variable (Patent Numb). The R Square is 0.341 which is very low and indicates there is no significant impact of independent variable on the dependent variables.

Data from 2008 to 2018 show that the number of patents in the UK has not changed much, but the number of international students has increased. This indicates that the factors influencing the increase in innovation in the field of higher education are not activated. The presence of modern and knowledge-based companies, scientific cooperation with the world's industrial companies is one of the main reasons for the growth of patents. Therefore, changes in the number of foreign students as well as female students cannot have a significant impact on promoting creativity and inventions in the UK (UK Intellectual Property Office, 2017).

## 4.15 Germany - Patent Number and International & Female Students Number

The gathered data are as follow:

Table 41: Patent Number and International & Female Students Number in Germany*

| Germany | | | |
|---|---|---|---|
| Year | Female student Ratio (%) | Inbound International amount (number) | Patent Quantity (Number) |
| 2008 | 49.2786 | 116894.3 | 62417 |
| 2009 | 52.0852 | 132748.4 | 59583 |
| 2010 | 54.8918 | 148602.5 | 59245 |
| 2011 | 57.6984 | 164456.6 | 59444 |
| 2012 | 60.5049 | 180310.7 | 61340 |
| 2013 | 59.434 | 196619 | 63167 |
| 2014 | 63.9429 | 210542 | 65965 |
| 2015 | 67.0439 | 228756 | 66893 |
| 2016 | 69.4629 | 244575 | 67899 |
| 2017 | 70.7069 | 258873 | 67712 |
| 2018 | 74.5378 | 275435.3 | 67898 |

1) (*School Enrollment, Tertiary, Female (% Gross) | The World Bank Data*, 2020);
2) Uis. (2020). UIS Statistics. Retrieved from http://data.uis.unesco.org/.

The conducted regression analysis results for both dependent variables are:

Table 42: Model Summary of Patent Number and International & Female Students Number in Germany

**Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .892[a] | .796 | .744 | 1815.954 |

a. Predictors: (Constant), FemaleStudRatio, ForeignStudent

Table 43: ANOVA of Patent Number and International & Female Students Number in Germany

**ANOVA[a]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 102637237.655 | 2 | 51318618.828 | 15.562 | .002[b] |
| | Residual | 26381507.072 | 8 | 3297688.384 | | |
| | Total | 129018744.727 | 10 | | | |

a. Dependent Variable: PatentQuant
b. Predictors: (Constant), FemaleStudRatio, ForeignStudent

Table 44: Coefficients of Patent Number and International & Female Students Number in Germany

**Coefficients[a]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | | |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | t | Sig. |
| 1 | (Constant) | 65529.862 | 19330.468 | | 3.390 | .010 |
| | ForeignStudent | .126 | .093 | 1.843 | 1.353 | .213 |
| | FemaleStudRatio | -427.975 | 604.067 | -.965 | -.708 | .499 |

a. Dependent Variable: PatentQuant

The ANOVA significancy is less than 0.05 which means the model is OK; the R Square is indicates that 79.6% of the dependent variable (Patent Numbers) can be explained by independent variables (Admitted Female Students) and (Admitted International Students).

Like the United States, Germany has laid the core of innovation in industrial investment and knowledge-based companies. Elite selection has been one of the root causes of the creativity growth in this country (Frenette, 2017). As the number of international students grows, the number of patents in Germany will not increase significantly, also the participation of women in academic education will not have a significant impact on promoting innovation.

By considering the Standardized Coefficients, it indicates that there is no relation between the independent variables and depend variable. Despite the efforts made in recent decades to bridge the gender gap between men and women, there is still the prevailing belief that one must act like a man to succeed at work. It is as if there is a framework in mind for success in the workplace, the foundation of which is also based on the historical dominance of men. The most important factor that seems to receive less attention is the creation of mental security in women.

Due to their mental and historical backgrounds, women mostly find themselves in the margins of the workplace. Therefore, they try harder to prove that they deserve more than being in marginalized groups. Although striving is generally a positive activity, sometimes women combine striving with changing their feminine traits (whether enhancing or diminishing) in order to be successful and distance themselves from the marginal group they think they are in, being suitable for working in work environments and being able to achieve the success they have created in their minds.

# Chapter 5

# CONCLUSION

## 5.1 Discussion and Conclusion

The performance of universities affects the personality traits and structure of society. One of the missions of the university is to create job opportunities for people, especially young people (Хакимов, 2020). Creating jobs for young people is one of the major concerns of various governments (O'Higgins, 2017).

Unemployment is one of the biggest economic challenges in many countries (Furman, 2021). The unemployment rate, on the one hand, identifies the depth of an economy's problems and, on the other hand, has psychological effects on the population of each country.

For example, the Malaysian Deputy Minister of Human Resources in 2005 says that one of the main reasons for not reducing the unemployment rate of graduates is the incompatibility of curricula and academic disciplines with the skills required in the labor market. (Utusan Malaysia, 18th May 2005). Although, the content of curricula is different from the performance of higher education, designing the curricula in align with market demands can be more effective (Anastasiu, Anastasiu, Dumitran, Crizboi, Holmaghi, & Roman, 2017).

Also, it is clear that the labor market demands of any small geographical area, such as a province, may be different from its neighboring province. Therefore, logically, universities in each province should provide educational services that meet this market needs, but in reality, all universities in a large-scale geographical area such as the USA, provide curriculum and the number of students, and the requirements in each field are selected based on the competitive environment between universities. Even with crises such as recessions, universities are reluctant to change curricula and types of disciplines to facilitate exit from the crisis (Rothwell, J., 2012).

The results of statistical analysis regarding the Hypothesis (1) show that in developed countries, with the increase in financial aid from the government, the unemployment rate of graduates also increases in US, Netherland, UK. This means that there is no need in the labor market for university graduates. For example, with each unit increase in government funding, the unemployment rate for college graduates in the Netherlands will increase by 84%, in the United States by 87.1% and in the United Kingdom by 73.6%.

This conclusion does not apply in Germany. According to the results, with each unit (1 Euro) increase in government assistance, the unemployment rate of educated people decreases by 80.8% based on Table 24. The reason for this is the high demand of the international market for technological products and services of this country. Germany, as a manufacturing and trading partner of most developed countries, still needs people with a university degree.

In Malaysia, regarding developing programs set by the Government, the labor market is more output from its universities. With each unit (1 Ringgit ) increase in government

assistance, the unemployment rate of educated people decreases by 78.7% based on Table 16.

We have to admit that the performance of the universities in countries like US, UK and Netherland is not integrated with the labor market which has not been able to produce the desired results. On the one hand, the needs of the labor market are not met, and we always face a shortage of skilled labor in many fields and occupations; and on the other hand, students in the same fields struggle with the unemployment giant because they have not acquired up-to-date job skills.

Also, one of the weaknesses in the employment of graduates is the lack of skills, expertise, and knowledge available to the workforce. Today we see that the workforce has several credentials but none of those certificates are practical. This is what makes graduates so interested in unrelated professions.

Regarding the Hypothesis (2) and Hypothesis (3), from the perspective of proper practices for admitting students, taking into account their gender and ethnicity, the results of statistical analysis show that with the increase in the number of foreign students as well as female students, the number of patents and innovation in the Netherlands, Germany and the United Kingdom does not increase. This means that the industrial and business entities actively participate in their research activities and are considered as centers for the production of science and research, and they themselves seek to attract elite educated people. In the US, the admission of female students to the universities and the number of innovations and patents has a negative correlation. And the two variables have a positive correlation in Malaysia. The admission of foreign

students have no correlation with patents and innovations in non of the sample countries.

In the United States, the increase in foreign students did not play a role in the growth of inventions, but as the presence of women in universities increases ( as per increasing 1 individual), the rate of innovation decreases by 55.2% based on Table 32. The reason could be that due to the social and economic conditions of this country, women prefer to study in university courses through which they can get a simple administrative job and manage their living expenses.

In contrast to the United States, invention rate in Malaysia grows by 1.132 based on Table 36 as more women attend universities (as per increasing 1 individual). This result shows the high and superior intelligence of women compared to men in this country and also their interest in participating in the field of research and innovation.

## 5.2 Implications

Practical solutions are provided for two sectors: policymakers in educational institutions and governments. In the first place, senior university administrators should tailor their curriculum to the needs of society and the labor market and review them at pre-determined intervals.

Governments, as custodians of social welfare, should monitor the performance of universities in the pursuit of social benefits, in particular the reduction of unemployment, the fight against discrimination and meritocracy, and, if necessary, review university policies. Legislatures can also provide a platform for beneficial communication between universities and work centers by providing facilities and even passing appropriate laws.

To improve the output of universities, as well as to make optimal use of the budgets provided by the government to universities, it is better to have tripartite cooperation between universities, the labor market, and the government in determining unemployment rates. This cooperation can reduce the gap between these three sectors and ultimately lead to higher social welfare.

## 5.3 Limitations and Future Study

Lack of data and financial information in the field of university expenses, especially expenses related to marketing activities, lack of information about female and international students admission for each field of study and also their share in patents, and lack of transparency of information related to ethical violations such as discrimination in university activities are the limitations of this thesis.

In addition to the above limitations, the unavailability of the exact number of female students admitted to universities, as well as the incompleteness of data related to the hypotheses related to this thesis for other parts of the world are other barriers to data collection.

For future studies, it is suggested that the relationship between the marketing costs of universities and the reduction of graduate unemployment rates, as well as the trend of legal complaints from universities about gender and racial discrimination in the student admissions process and its relationship with Social Benefit be investigated.

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