

KOF Swiss Economic Institute

The KOF Education System Factbook:

Germany

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Table of Contents

FOREWORD	V
EDITING AND ACKNOWLEDGEMENTS.....	VI
1. The German Economy and its Political System.....	1
1.1 The German Economy.....	1
1.2 The Labor Market.....	3
1.2.1 Overview of the German Labor Market.....	3
1.2.2 The Youth Labor Market.....	5
1.2.3 The KOF Youth Labor Market Index (KOF YLMI) for Germany.....	6
1.3 The Political System	8
1.3.1 Overview of the German Political System	8
1.3.2 Politics and Goals of the Education System	9
2. Formal System of Education.....	10
2.1 Pre-Primary Education.....	12
2.2 Primary and Lower Secondary Education.....	13
2.3 Upper secondary Education.....	14
2.4 Postsecondary / Higher Education.....	15
2.5 Continuing Education (Adult Education)	16
2.6 Teacher Education.....	17
3. The System of Vocational and Professional Education and Training.....	18
3.1 Vocational Education and Training (VET; Lower and Upper Secondary Education Level) 18	
3.1.1 Transitional VET (lower secondary).....	18
3.1.2 Dual VET (upper secondary)	19
3.1.3 School-based VET (upper secondary).....	21
3.2 Professional Education and Training (PET; Post-Secondary Level and Tertiary Level) 23	
3.2.1 Advanced professional education.....	24
3.2.2 Higher professional education	25
3.3 Regulatory and Institutional Framework of the VPET System	27
3.3.1 Central Elements of VPET Legislation.....	27
3.3.2 Key Actors	27
3.4 Educational Finance of the VPET System	30
3.4.1 Educational finance of the VET system	30
3.4.2 Educational finance of the PET system	31
3.5 Curriculum Development	32

3.5.1	Curriculum Design Phase	32
3.5.2	Curriculum Application Phase.....	34
3.5.3	Curriculum Feedback Phase	34
3.6	Supplying Personnel for the VPET System (Teacher Education).....	35
4.	Major Reforms in the Past and Challenges for the Future.....	36
4.1	Major reforms.....	36
4.2	Major challenges.....	37
	References	38
	Appendix: Regulatory Framework on Vocational Education and Training in Germany	46
	References (Appendix)	58

List of Abbreviations

AEVO	Ordinance on Trainer Aptitude
BAföG	Federal Training Assistance Act
BBiG	Vocational Education and Training Act
BerFiFG	Vocational Training Promotion Act
BIBB	Federal Institute for Vocational Education and Training
BMBF	Federal Ministry of Education and Research
BMI	Federal Ministry of the Interior
BMWi	Federal Ministry for Economic Affairs and Energy
CVC	Curriculum Value Chain
ECTS	European Credit Transfer and Accumulation System
GCI	Global Competitiveness Index
GG	German Basic Law
GII	Global Innovation Index
GDP	Gross Domestic Product
HE	Higher Education
ISCED	International Standard Classification of Education
KMK	Standing Conference of Ministers of Education and Cultural Affairs
KOF	Swiss Economic Institute
NEET	neither in Employment nor in Education or Training Rate
OECD	Organisation for Economic Co-operation and Development
PET	Professional Education and Training
PPP	Purchasing Power Parity
UAS	University of Applied Science
UIS	UNESCO Institute for Statistics
UNESCO	United Nations Educational, Scientific and Cultural Organisation
VET	Vocational Education and Training
VPET	Vocational Professional Education and Training
WEF	World Economic Forum
WTO	World Trade Organization
YLMI	Youth Labour Market Index

List of Figures

Figure 1: Employment in Germany by sector (as % of total employment), 1991-2014	2
Figure 2: YLM Scoreboard: Germany vs OECD average, 2014	7
Figure 3: YLM Index: Germany vs OECD average, 1991-2014	8
Figure 4: The German Education System	11
Figure 5: Enrolment by institutions of higher education	16
Figure 6: Curriculum Value Chain (CVC)	32

List of Tables

Table 1: Value added and employment by sector, 2015	2
Table 2: Labour force participation rate, unemployment rate by age, 2014	4
Table 3: Labour force participation rate, unemployment rate by educational attainment (people aged 25-64), 2013	5
Table 4: Enrolment (in thousands and in percent) at different educational levels, 2013	10
Table 5: Educational attainment (in thousands and in percent) of the population aged 25 years and older, 2014	12
Table 6: Apprentices with new training contracts and the top five frequently chosen occupations across highest school certificate in 2013	20
Table 7: Apprentices (and new training contracts) across sectors and highest school certificate in 2013	20
Table 8: Trade and technical school graduates across faculties and top three professional categories or <i>occupations</i> in 2014	25
Table 9: Students at University of Applied Science across fields of study, 2014/15	26

FOREWORD

The increasing competitiveness of the world economy as well as the high youth unemployment rates after the worldwide economic crises have put pressure on countries to upgrade the skills of their workforces. Consequently, vocational education and training (VET) has received growing attention in recent years, especially amongst policy-makers. For example, the European Commission defined common objectives and an action plan for the development of VET systems in European countries in the *Bruges Communiqué on Enhanced European Cooperation in Vocational Education and Training for 2011-2020* (European Commission, 2010). In addition, a growing number of US states and other industrialized, transition, and developing countries (for example Hong Kong, Singapore, Chile, Costa Rica, Benin and Nepal) are interested in either implementing VET systems or making their VET system more labor-market oriented.

The appealing outcome of the VET system is that it improves the transition of young people into the labor market by simultaneously providing work experience, remuneration and formal education degrees at the secondary education level. If the VET system is optimally designed, VET providers are in constant dialogue with the demand-side of the labor market, i.e. the companies. This close relationship guarantees that the learned skills are in demand on the labor market. Besides practical skills, VET systems also foster soft-skills such as emotional intelligence, reliability, accuracy, precision, and responsibility, which are important attributes for success in the labor market. Depending on the design and permeability of the education system, VET may also provide access to tertiary level education (according to the ISCED classification): either general education at the tertiary A level or professional education and training (PET) at the tertiary B level. PET provides occupation-specific qualifications that prepare students for highly technical and managerial positions. VET and PET systems are often referred to together as “vocational and professional education training (VPET)” systems.

Few countries have elaborate and efficient VPET systems. Among these is the Swiss VPET system, which is an example of an education system that successfully matches market supply and demand. The Swiss VPET system efficiently introduces adolescents to the labor market, as shown by Switzerland’s 2007-2017 average youth unemployment rate of 8.1 percent compared to 14.8 percent for the OECD average (OECD, 2017).

Though not many countries have VPET systems that are comparable to Switzerland’s in terms of quality, efficiency and permeability, many have education pathways that involve some kind of practical or school-based vocational education. The purpose of the KOF Education System Factbook Series is to provide information about the education systems of countries across the world, with a special focus on vocational and professional education and training.

In the KOF Education System Factbook: Germany, we describe Germany's vocational system and discuss the characteristics that are crucial to the functioning of the system. Essential components comprise the regulatory framework and the governance of the VPET system, the involved actors, and their competencies and duties. The Factbook also provides information regarding the financing of the system and describes the process of curriculum development and the involved actors.

The Factbook is structured as follows: First, we provide an overview of Germany's economy, labor market, and political system. The second part is dedicated to the description of the formal education system. The third section explains Germany's vocational education system. The last section offers a perspective on Germany's recent education reforms and challenges to be faced in the future.

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The KOF Education System Factbooks is regarded as work in progress. The authors do not claim completeness of the enclosed information, which has been collected carefully and consciously. Any suggestions for improvement are welcome!

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1. The German Economy and its Political System

One of the main purposes of an education system is to provide the future workforce with the skills needed in the labor market. The particularities of a country's economy and its labor market are important factors determining the current and future demand for skills. Therefore, these will briefly be described in the first part of this Factbook. In addition, this part provides an overview of Germany's political system with emphasis on the description of the education politics.

1.1 The German Economy

Germany's economy is the 4th largest in the world with a gross domestic product (GDP) of US\$ 3.5 trillion and a per capita GDP of US\$ 42,850¹. For comparison, the G7² average GDP per capita is US\$ 43,449, and the OECD average is US\$ 37,040 (all numbers refer to 2015; OECD, 2015b). Since the German reunification in 1990, the German economy grew on average 1.4 percent annually until 2014, which is lower than the G7 average of 1.5 percent and the OECD average of 2.0 percent (World Bank, 2015a). Although the economy has recovered from the 2008 global crisis, Germany is facing a weakened labor productivity growth, a shrinking labor supply due to an ageing workforce and a high level of dependence on the export industry (OECD, 2016d).

The distribution of value added and employment by sector (as seen in Table 1) shows that Germany is a highly-developed country. Although the proportion of workforce in the secondary and tertiary sectors exceeds that of the EU-28 states, the tertiary sector lies below the EU-28 average in terms of value added. In contrast, Germany's export oriented manufacturing sector³ is highly competitive (compared to EU-28) and has had a larger productivity growth than Germany's business services between 1997 and 2015 (OECD, 2016d).

In 2015, more than two thirds (74.1 percent) of Germany's workforce was employed in the services sector, while the industry sector accounted for less than one third (24.5 percent). This implies that the high productivity of the industry sector is to a substantial part achieved through the use of machines. Not surprisingly, labor productivity is much higher in the services sector. The agricultural sector only plays a minor role for employment.

¹ Constant prices, constant purchasing power parity (PPP), reference year 2010.

² Group of 7 (United States of America, Japan, Germany, United Kingdom, France, Italy and Canada).

³ Mainly transport, electronic and optical equipment as well as chemicals.

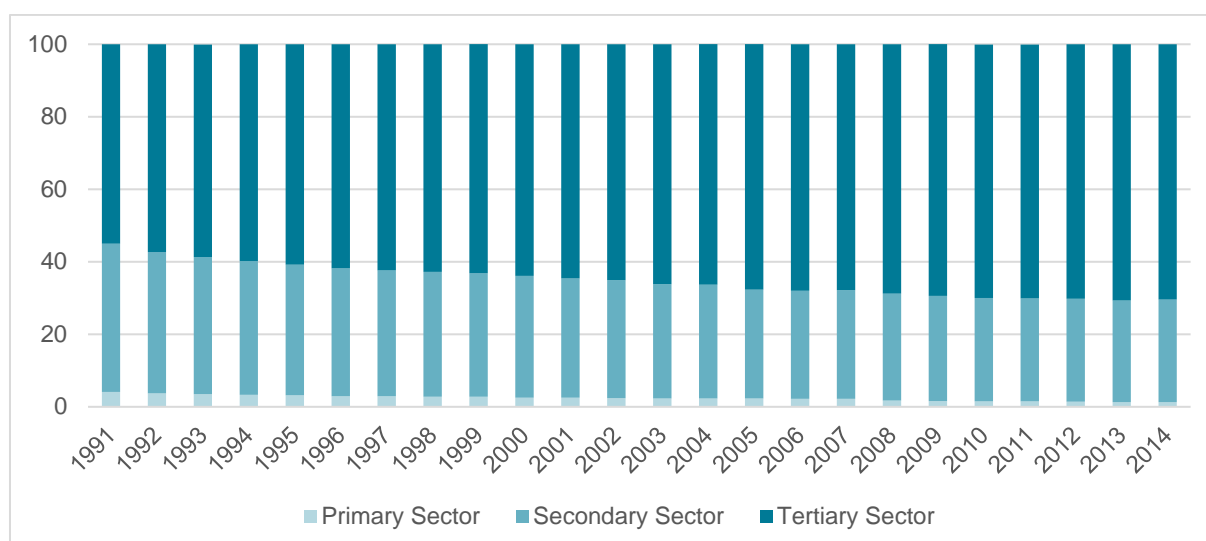
Table 1: Value added and employment by sector, 2015

Sector	Germany: Value added (%)	EU-28: Value added ⁴ (%)	Germany: Employment ⁵ (%)	EU-28: Employment (%)
Primary sector	0.5	1.5	1.5	4.8
Agriculture, hunting and forestry, fishing	0.5	1.5	1.5	4.8
Secondary sector	30.4	24.4	24.5	21.8
Manufacturing, mining and quarrying and other industrial activities	25.7	19.0	18.8	15.5
of which: Manufacturing	22.6	15.6	17.4	13.9
Construction	4.7	5.4	5.7	6.3
Tertiary sector	69.1	74.0	74.1	73.4
Wholesale and retail trade, repairs; hotels and restaurants; transport; information and communication	20.4	24.0	25.8	27.6
Financial intermediation; real estate, renting & business activities	26.3	27.3	17.3	16.1
Public administration, defense, education, health, and other service activities	22.4	22.7	31.0	29.7

Source: Own illustration, based on Eurostat (2015a; 2015b).

The decline of employment in the primary and secondary sector (as seen in Figure 1) highlights the development of the former major industrial nation. Despite the downturn of workforce in the secondary sector, Germany's competitive manufacturing companies are generating current account surpluses to the extent that the country has the highest accumulated surplus in the world (US\$ 290.3 billion per 2014; WTO, 2015).

Figure 1: Employment in Germany by sector (as % of total employment), 1991-2014



Source: Own illustration, based on World Bank (2015a).

⁴ Due to rounding differences, the sum of all sector falls below 100 percent.

⁵ Due to rounding differences, the sum of all sector exceeds 100 percent.

Besides Germany's economic volume and power, the economy is also highly competitive and innovative. Due to advanced businesses, which incorporate efficient international supply chains, utilize the latest technologies and spend a high share on research development, Germany is ranked 4th in the Global Competitiveness Index (GCI). Supported by excellent on-the-job training and an efficient use of its talent pool, Germany outranks every other G7 member, except the United States of America (WEF, 2015). In the Global Innovation Index (GII) Germany took 12th place, resulting from a strong creation of knowledge⁶ and its impact in high and medium-high-tech manufactures (Dutta et al. 2015).

1.2 The Labor Market

In the first part of this section, we will describe the general situation of Germany's labor market. In the second part, we will focus on the youth labor market.

1.2.1 Overview of the German Labor Market

The German labor market vigorously protects permanent workers against individual and collective dismissals⁷ (OECD, 2016a). Examples of regulation are manifold. Firstly, a third party⁸ must be notified of a dismissal and it may hold the power of rejecting a dismissal. Secondly, the definition of an unfair dismissal⁹ is broad: if the company can somehow retain the employee within the organization or the dismissal does not take social considerations into account (e.g. seniority, age, alimony) it is not deemed fair. Lastly, severance pay is comparatively high for long tenure workers (OECD, 2016b). The WEF (2015) describes these restrictive labor regulations as problematic factors of doing business. Germany could improve its rank in the GCI by deregulating dismissal practices and wage determination.

Trade unions in Germany have been losing members since 1999. In 2013 however, the trade union density was at 18.1 percent, which is still slightly above the OECD average of 17 percent (OECD, 2014a). In addition, more and more firms opted out of collective bargaining agreements, allowing them to adjust their cost structure through the wage margin. The decrease in collective bargaining and a growing number of working poor urged Germany to establish a statutory minimum wage in 2015¹⁰, at around 50 percent of median earnings. According to the OECD, high labor taxes (social security contributions accounting for one third

⁶ Among others measured by patent applications per GDP.

⁷ Germany ranks 64th of 72 in the OECD index of employment protection, whereas the rank 1 indicate the least restrictive country (OECD, 2016a)

⁸ Work council or the competent labour authority.

⁹ Unfair dismissal lead to compensations of up to 12 months (OECD, 2016b).

¹⁰ Germany is the 26th OECD country to establish a statutory minimum.

of the tax wedge), hamper the anti-poverty impact of the statutory minimum wage in Germany¹¹ (OECD, 2015a).

In 2015, an above OECD average share of the total German population aged 15 to 64 (77.6 versus 71.3 percent for the OECD average) was either actively searching for a job or was in employment, i.e. belonged to the total labor force (see Table 2). The same picture holds if disaggregated by age: relative to the OECD average, a larger share of the youth in Germany (aged 15-24: 48.8 vs. 47.1 percent for the OECD average), as well as a larger share of the adults (aged 25-64: 83.1 vs. 76.9 percent for the OECD average) were in the labor force in 2015.

Table 2: Labor force participation rate, unemployment rate by age, 2015

	Labor force participation rate		Unemployment rate	
	Germany	OECD average	Germany	OECD average
Total (15-64 years)	77.6	71.3	4.7	7.0
Youth (15-24 years)	48.8	47.1	7.2	14.0
Adults (25-64 years)	83.1	76.9	4.4	6.0

Source: Own illustration, based on OECD (OECD, 2017b).

In 2015, the unemployment rate in Germany had reached the lowest level in 25 years; the fifth lowest unemployment rate among the OECD countries (4.7 vs. 7 percent for the OECD average). The German youth unemployment rate (7.2 percent) is the third lowest among the OECD countries (average of 14 percent).

According to the OECD, Germany will face a decrease of the labor supply due to an ageing society in the medium term, which may result in a labor shortage. By including more women, older workers and the recent inflow of refugees into the labor market, a scarcity of skilled workers could be prevented (OECD, 2016d).

The German labor force participation rate also exceeds the OECD average when analyzed by education level (see Table 3, for the year 2013). However, an over-proportional part of the group of people with less secondary education faces a higher probability to become unemployed than in the OECD countries on average. Not only the risk of becoming unemployed, but also the wage difference between low- and high-skilled is relatively high in Germany (OECD, 2015a).

¹¹ The tax wedge (tax on income paid by both the employee and the employer) for an average single worker is 49.4 percent, 3rd highest among all 34 OECD countries, 34.0 percent and 10th highest for an average married worker with two children respectively (OECD, 2016c).

Table 3: Labor force participation rate, unemployment rate by educational attainment (people aged 25-64), 2014

	Labor force participation rate		Unemployment rate	
	Germany	OECD average	Germany	OECD average
Less than upper secondary education	65.9	63.6	12.0	12.8
Upper secondary level education	83.5	79.9	4.6	7.7
Tertiary education	90.3	87.7	2.5	5.1

Source: Own illustration, based on OECD (OECD, 2016d).

On the one hand, the high labor force participation and low unemployment rate in Germany reflects its economic power. On the other hand, it is the result of rigorous labor market reforms initiated by the German government from 2003 onwards (so-called “Harz Refom”). In the course of these reforms, temporary work (temporary contracts and temporary agency work), as well as the unemployment benefit system were reformed in order to “flexible” the labor market. As mentioned in the beginning. This flexibilization also came at a cost- especially of those at the lower end of the wage distribution. As mentioned in the first part of this section, the introduction of the minimum wage was one reaction of the government to a growing number of so-called “working poor”, i.e. people who, despite being employed, do not earn enough to cover their expenses and therefore receive top-up payments from public sources. Another consequence of the flexibilization of the labor market was the steady increase temporary forms of employment (either through more temporary workers or outsourcing of employment through temporary work agencies). (Detragiache , Raei , & Engbom , 2015)

1.2.2 The Youth Labor Market

The KOF Swiss Economic Institute developed the KOF Youth Labour Market Index (KOF YLMI) to compare how adolescents participate in the labor market across countries (Renold et al., 2014). The foundation for this index is the critique that a single indicator, such as the unemployment rate, does not suffice to describe the youth labor market adequately nor provide enough information for a comprehensive cross-country analysis. To increase the amount of information analyzed and to foster a multi-dimensional approach, the KOF YLMI consists of twelve labor market indicators¹² that are grouped into four categories.

¹² The data for these indicators are collected from different international institutions and cover up to 178 countries for the time period between 1991 and 2012.

The first category describes the *activity state* of youth (ages 15-24 years old) in the labor market. Adolescents are classified according to whether they are employed, in education, or neither (unemployed, discouraged and neither in employment nor in education or training; see info box to the right). The category *working conditions* and the corresponding indicators reflect the type and quality of jobs the working youth have. The *education* category accounts for the share of adolescents in education and training and for the relevance of and their skills on the labor market. The fourth category, *transition smoothness*, connects the other three categories by capturing the school-to-work transition phase of the

Dimensions of the KOF YLMI
Activity state - Unemployment rate - Relaxed unemployment rate ¹³ - Neither in employment nor in education or training rate (NEET rate)
Working conditions Rate of adolescents: - with a temporary contract - in involuntary part-time work - in jobs with atypical working hours - in work at risk of poverty ¹⁴ Vulnerable unemployment rate ¹⁵
Education - Rate of adolescents in formal education and training - Skills mismatch rate
Transition smoothness - Relative unemployment ratio ¹⁶ - Long-term unemployment rate ¹⁷
Source: Renold et al. (2014).

youth. Each country obtains a score of 1 to 7 on each particular indicator of the KOF YLMI. A higher score reflects a more favorable situation regarding the youth labor market and a more efficient integration of the youth into the labor market.

One of the major drawbacks of the KOF YLMI is data availability. When data is lacking, a category can occasionally be based on a single indicator or must be omitted entirely when not a single indicator for that category exists in a given country. A lack of indicators can make comparisons across certain countries or groups of countries problematic and sometimes even impossible.

1.2.3 The KOF Youth Labor Market Index (KOF YLMI) for Germany

Figure 2 shows the KOF YLMI for Germany and the OECD average for 2015. For Germany, data on all sub-categories of the KOF YLMI are available for the year 2015. Germany's score on the KOF YLM Index (5.5) outperforms that of the OECD average (5.0) (see Figure 2). By compartmentalizing the index, we can see that Germany trumps the OECD average in ten out of twelve dimensions. Germany seems to have a larger skills mismatch problem than the other OECD countries on average, as well as a higher incidence of long-term unemployment among the youth. Especially strong is Germany's score in the activity state category (unemployment

¹³ It is calculated as the number of unemployed and discouraged workers as a share of the entire labour force. Discouraged workers have given up the search for work (not actively seeking), although they have no job and are currently available for work (also: "involuntary inactive").

¹⁴ Those who cannot make a decent living out their earnings, being at risk of poverty as a percentage of the working population.

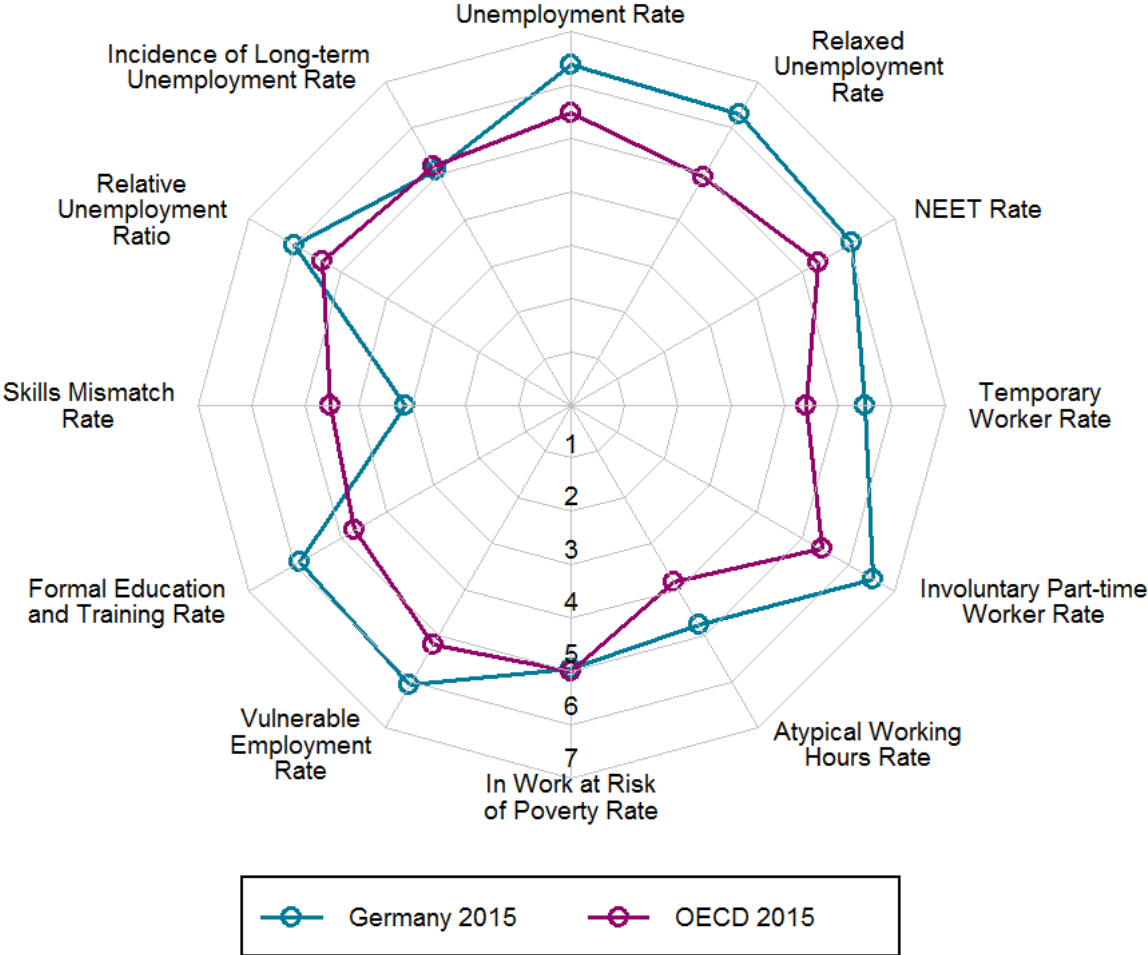
¹⁵ Share of the employed population working on their own account or those working in their family business and thus contributing to the entire family income. Both are less likely to have formal work arrangements and are therefore less protected by labour laws and more exposed to economic risk.

¹⁶ Is defined as the youth unemployment rate (15-24 years) as a share of the adult unemployment rate (25+). If the youth cohort is affected in the same way than the adult group with respect to unemployment, then the relative unemployment ratio will be equal to one. If the youth are relatively more affected, then the ratio will be bigger than one.

¹⁷ Those unemployed for more than one year (52 weeks) in the total number of unemployed (according to the ILO definition).

rate, relaxed unemployment rate and NEET rate). However, Germany exhibits a low Skills Mismatch score, which is worthy of deeper research (Renold et al., 2014). The comparison demonstrates (along with the OECD Employment Outlook 2015 data) the favorable labor market conditions in Germany for its youth.

Figure 2: YLM Scoreboard: Germany vs OECD average, 2015



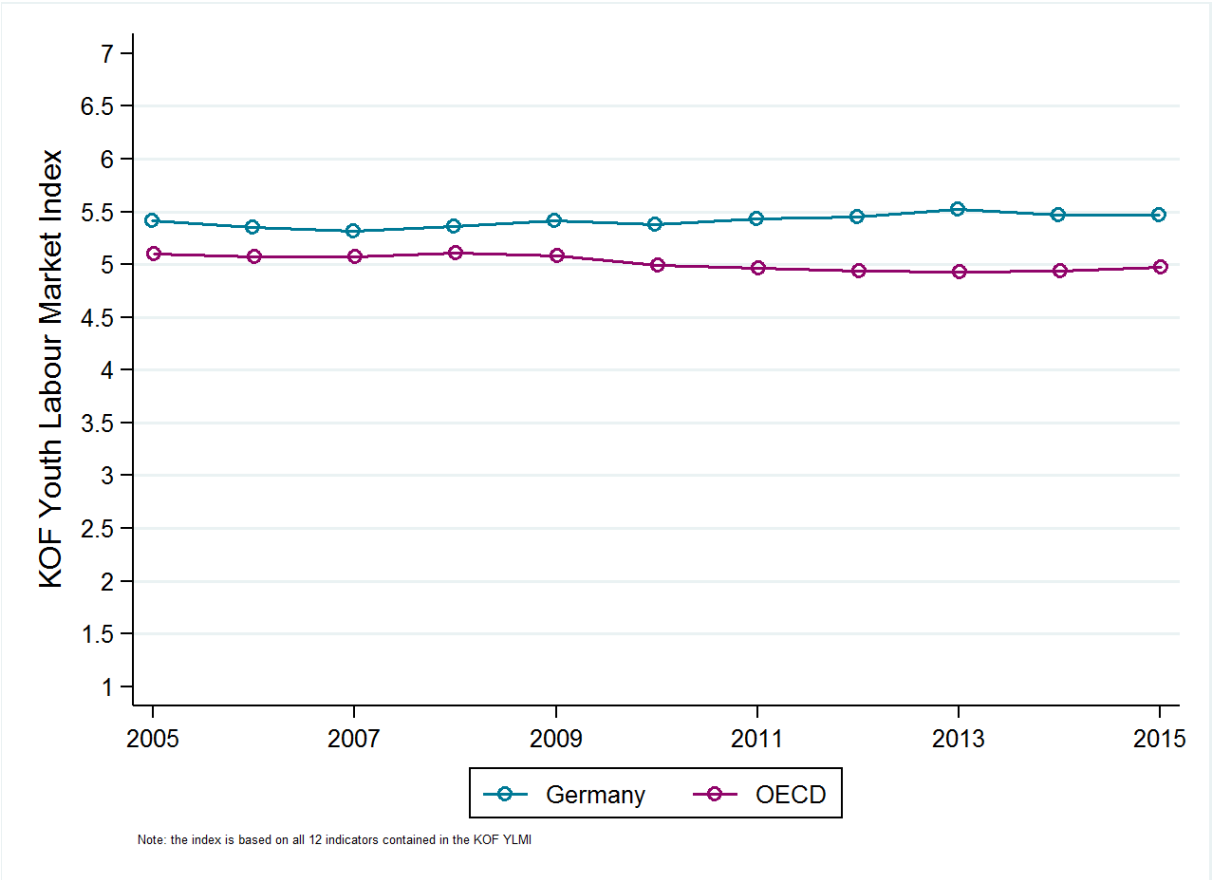
Source: KOF (forthcoming).

Figure 3 shows the evolution of the KOF YLMI for Germany and the OECD average from 2005 to 2015. For this time, data for all sub-dimensions of the KOF YLMI are available. The positive evolution of the KOF YLMI for Germany since the global crisis in 2008 is associated with a favorable development in the activity state score. Although the previously mentioned problematic skills mismatch rate slows the positive trend of the entire index¹⁸, it cannot halt the

¹⁸ The Skills Match score decreased from an all-time high in 2004 of 5.62 to 3.70 in 2013.

continuous increase¹⁹. The data suggests that the labor market situation for youth in Germany has been slightly improving of the observed time.

Figure 3: YLM Index: Germany vs OECD average, 2005-2015



Source: KOF (forthcoming).

1.3 The Political System

Understanding the basics of a country’s political system and getting to know the political goals with respect to its education system are crucial steps towards understanding of the education system in a broader sense. In the first part, we explain Germany’s political system. How the political system and education goals affect the education system will be referred to in the second part.

1.3.1 Overview of the German Political System

The Federal Republic of Germany is a democratic-parliamentary federal state with 16 member states (Bundesländer). All member states incorporate local municipalities²⁰ with limited independence and self-governance (BMI, 2016). According to the principle of separation of

¹⁹ Before 2005 not all twelve dimensions of the KOF YLM Index were available for Germany and the OECD average.
²⁰ Municipalities are constitutionally part of the member states and therefore do not count as the third level of the federal state (BMI, 2016).

powers, three branches control both levels of governance²¹: legislature (German Bundestag & German Bundesrat and Landtag), executive (Federal Chancellor & the Cabinet and the State Governments of the member states) and judiciary (Federal and State Constitutional Court(s) and other state courts; BT, 2016). Whereas the State Governments of the member states elect the members of the German Bundesrat, citizens directly elect the members of the German Bundestag every four years, who go on to elect the Federal Chancellor (§51 Abs. 1, §38f. and §63, GG).

The Federal Republic of Germany is regarded as a well-functioning state. Firstly, The Economist Intelligence Unit (2016) titles Germany as a full democracy and ranks it 13th of 167 independent states or territories in the Democracy Index of 2015. Secondly, Transparency International (2015) classifies Germany as “clean” with 80 of 100 points in its Corruption Perception Index 2015. Lastly, companies, citizens and experts surveyed by the World Bank (2015b) view the overall performance of the German government as medium strong – average only in the perception of its political stability and absence of violence and terrorism.

1.3.2 Politics and Goals of the Education System

The German Education System is under supervision by the Federal Republic of Germany, but German Basic Law attributes the legislative jurisdiction²² to the member states (§7 and §30). The states’ members, municipalities and schools distribute key decision-making among themselves more evenly than most OECD countries (OECD, 2012). Additionally, the funding structure of the education system reflects the distribution of power. In 2012, the total education budget of € 181.4 billion (6.6 percent of the GDP) was allocated as follows: The Federal Republic (10.0 percent), member states (54.0 percent), municipalities (15.1 percent), private sector²³ (20.6 percent) and foreign countries (0.4 percent; Destatis, 2015a). To support the cooperation between the different actors, an organization called Standing Conference of Ministers of Education and Cultural Affairs (Kultusministerkonferenz, KMK) was established. Besides traditional subjects (e.g. mathematics or German), the German Education System ought to impart historic-political²⁴, economic and cultural knowledge (KMK, 2016a). Notwithstanding the high standard of the education system²⁵, the KMK defined several fields of action to improve the current system: enhancement of linguistic, mathematical and natural

²¹ Federal state and member states.

²² From early childhood education to doctoral education

²³ Private households, companies and non-profit organizations.

²⁴ Education about National Socialism & the Holocaust, democracy and Europe

²⁵ Not only does the WEF rank the German Education System 10th of 140 in the GCI (2015) but German students outscored the OECD average of 497 in the Pisa test in 2012 with a score of 514 statistically significantly (OECD, 2014b).

science competences, strengthened the support of educationally disadvantaged children and increased professionalism in teaching (Maaz et al., 2015).

2. Formal System of Education

The German education system is subdivided into nine levels (0 – 8), per the International Standard Classification of Education (ISCED) 2011 of the UNESCO Institute for Statistics (2015a). An illustration of the German education system can be seen in Figure 4.

In 2013, 16.7 million students (20.7 percent of the population in Germany) were enrolled at any ISCED 2011 level in the German education system (UIS, 2016a). Table 4 shows the enrolment for each educational level in absolute terms and in percentage.

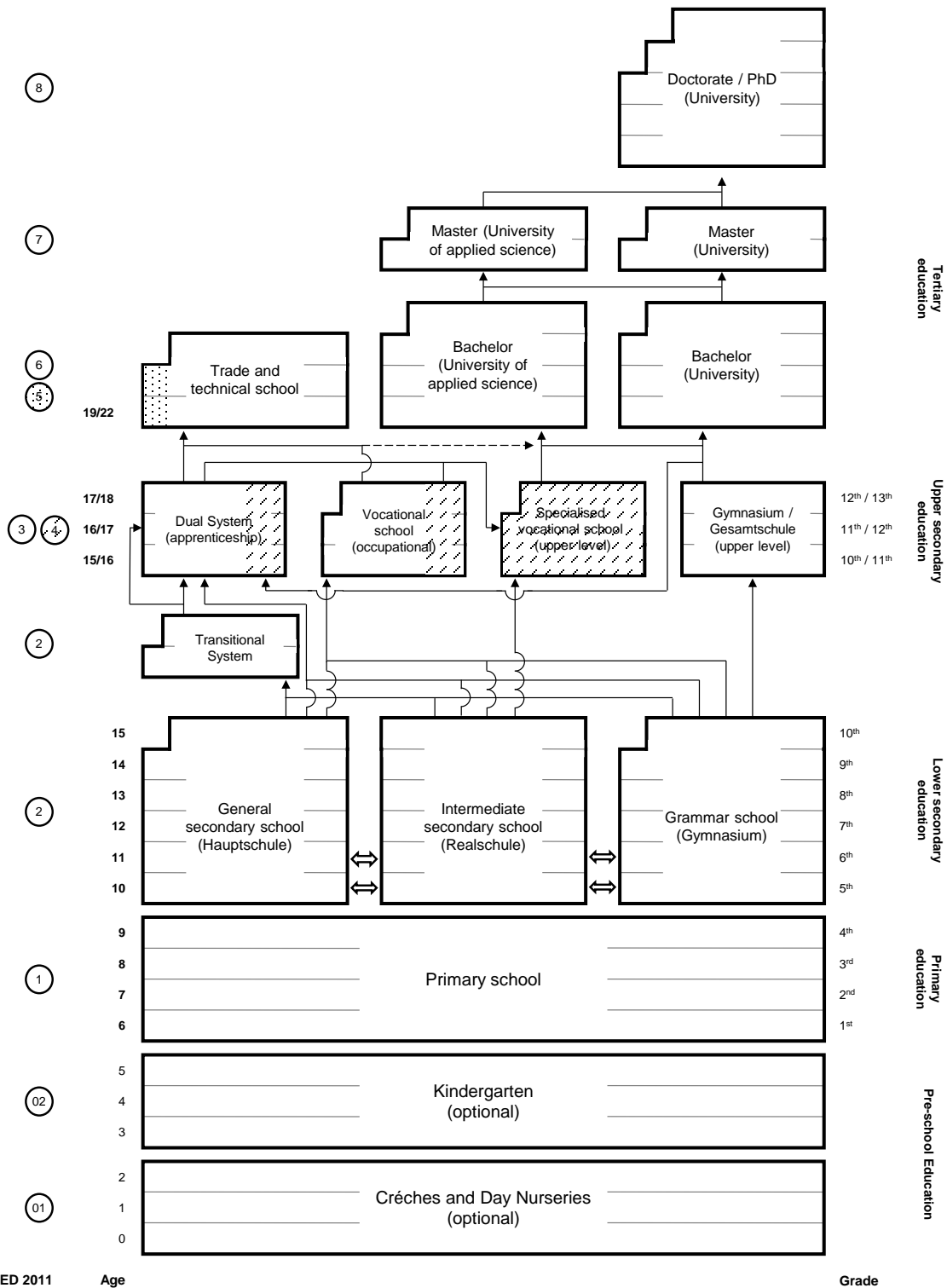
Table 4: Enrolment (in thousands and in percent) at different educational levels, 2013

Educational level	ISCED 2011	Enrolment (in thousands)	Enrolment (in % of total)
Total students	0 – 8	16,673.6	100.0
Early childhood educational development programs	0	677.9	4.1
Pre-primary education	0	2,207.1	13.2
Primary education	1	2,890.5	17.3
Secondary education	2 – 3	7,289.4	43.7
<i>Lower secondary education</i>	2	4,713.7	28.3
Of which VET	2	114.8	0.7
<i>Upper secondary education</i>	3	2,575.7	15.4
Of which VET	3	1,223.7	7.3
Post-secondary non-tertiary education	4	828.7	5.0
Tertiary education	5 – 8	2,780.0	16.7
<i>Short-cycle tertiary education</i>	5	0.5	0.0
<i>Bachelor's or equivalent level</i>	6	1,635.9	9.8
<i>Master's or equivalent level</i>	7	930.4	5.6
<i>Doctoral or equivalent level</i>	8	213.2	1.3

Source: Own illustration, based on UIS (2015a; 2016a)

The German population features a high level of educational achievements: In 2014, 82.9 percent of the population aged 25 years and older had attained at least an upper secondary education degree (UIS, 2016b). Table 5 shows the educational attainment of adults aged 25 years and older.

Figure 4: The German Education System



Source: Own illustration, based on KMK (2016b) and OECD (2013).

Table 5: Educational attainment (in thousands and in percent) of the population aged 25 years and older, 2014

Educational level	ISCED 2011	Educ. attained (in thousands)	Educ. attained (in % of total)
Total population aged 25 years or older		61,615.1	100.0
Primary education	1	1,969.4	3,2
Secondary education	2 – 3	38,992.8	63,3
<i>Lower secondary education</i>	2	8,491.9	13,8
<i>Upper secondary education</i>	3	30,500.9	49,5
Post-secondary non-tertiary education	4	5,261.5	8,5
Tertiary education	5 – 8	15,303.5	24,9
<i>Short-cycle tertiary education</i>	5	424.4	0,7
<i>Bachelor's or equivalent level</i>	6	8,265.6	13,4
<i>Master's or equivalent level</i>	7	5,836.4	9,5
<i>Doctoral or equivalent level</i>	8	777.1	1,3
Unknown	n/a	87.9	0,1

Source: Own illustration, based on UIS (2016b).

2.1 Pre-Primary Education

Since 2013, all children are unconditionally entitled to an early (yet voluntary) childhood education after the first year of life (§24, Kinder- und Jugendhilfegesetz). To meet this legal claim, Germany²⁶ invested €5.4 billion in pre-primary education up until 2014, and is going to spend € 845 million annually starting in 2015 (BMFSFJ, 2015). In line with the principle of subsidiarity, pre-primary institutions are two-thirds privately owned²⁷ and publicly part-funded and one-third publicly owned and funded²⁸ (Schliermann, 2016). Due to regionally varying grants for pre-primary institutions, the fees payable²⁹ range from zero to € 1,752 per year for one child living in a household with a gross income of €45,000 (IW Consult GmbH Köln, 2010). Pre-primary education is divided as follows:

Day nurseries and crèches were visited by 32.9 percent of the under-three year olds in 2015 (Destatis, 2015b). The aim of nurseries and crèches is broadly defined: the education should be need-based, quality-oriented and flexible timewise (BMFSFJ, 2015).

Kindergartens are visited by 94.9 percent of three to five-year-olds in 2015 (Destatis, 2015b). As a family-complementing institution, it follows a legal educational mission (yet with different pedagogical approaches) to provide experience and training opportunities outside the child's regular milieu (KiTa.de, n.d.).

²⁶ The Federal Republic of Germany and its member states.

²⁷ Private owners are religious organizations, clubs, parents' initiatives and commercial organizations.

²⁸ The budget for pre-primary education of € 23.6 billion in 2012 (13.0 percent of the total education budget), is mainly publicly funded: Municipalities (46.3 percent), member states (28.2 percent) and the Federal Republic of Germany (1.6 percent) compared to private means (23.9 percent; Destatis, 2015a).

²⁹ Financial support is given for families or children in need (§90, Kinder- und Jugendhilfegesetz).

Additionally, 2.4 percent of the six-year-olds who were not yet ready to attend primary school visited school kindergarten, and 1.6 percent of the five-year-olds who were already capable of attending school (but had not had reached compulsory school age) visited pre-school classes in the school year 2014/15 (BMBF, 2015a; UIS, 2015b).

2.2 Primary and Lower Secondary Education

Primary and lower secondary education are compulsory for all minors in all German member states (Vossenkuhl, 2010). According to the legislative jurisdiction of the education system, member states and municipalities are responsible for providing enough schools and mostly funding the educational institutions³⁰ (Destatis, 2015a).

Primary Education is the basic education³¹ for all³² six to nine-year-olds, which not only aims to build a basis for lifelong learning but also fosters psychomotor skills and social attitudes (KMK, 2015a). While most children visit regular primary schools (95.0 percent in the school year 2012/13), some get their first formal education in comprehensive schools (0.8 percent), Free Waldorf schools (0.9 percent) or special needs schools³³ (3.3 percent; UIS, 2015b).

Lower Secondary Education builds on the solid basis of primary education and prepares the 10 to 15/16-year-olds in full-time schools for progression to upper secondary education. The curriculum across all school types includes courses in social sciences (languages³⁴ and history), courses in natural sciences (mathematics, physics, chemistry, biology and geography) and other subjects (music, art, sport and religious studies; KMK, 2015a). Secondary education is a permeable system – even after a two-year orientation phase, transfers between educational paths are possible. The general education is split up into three levels³⁵: General secondary schools (Hauptschule) teach at a basic level, intermediate secondary schools (Realschule) at a more extensive level, and grammar schools (Gymnasium) at an intensified level (ibid). In the school year 2012/13, 13.5 percent of students were enrolled in general secondary schools, 24.0 percent in intermediate secondary schools and 33.2 percent in grammar schools (UIS, 2015b). Each level leads to different school-leaving certificates: a lower secondary school-leaving certificate (Hauptschulabschluss) for completing general secondary

³⁰ Due to inconsistent cost-calculations among the member states, it is not possible to distinguish vocational from general programmes. Therefore, includes the following breakdown the cost of the upper secondary and vocational education too: In 2012, the member states (82.2 percent) and municipalities (13.8 percent) mainly funded the total cost of €71.9 billion – 39.6 percent of the total education budget.

³¹ The basic education mainly focusses on linguistic, mathematical and scientific competencies, but students are also educated in arts, music, sports and in most member states religious studies (KMK, 2015a).

³² Exceptions are as seen in chapter 2.1 Pre-Primary Education (see school kindergarten).

³³ Schools for children who are for example blind, deaf or mentally handicapped.

³⁴ German and at least one foreign language (usually English).

³⁵ Several paths besides the regular three exist: schools that are offering different educational levels (9.6 percent), comprehensive schools that combine different educational levels (12.5 percent), special needs schools (4.1 percent), Free Waldorf schools (0.9 percent) and level-independent orientation schools (2.2 percent).

school, an intermediate school-leaving certificate (Realschulabschluss or Mittlere Reife) for completing intermediate secondary school and a general higher education entrance qualification (Allgemeine Hochschulreife³⁶) for finishing grammar school (KMK, 2015a). Adults are also able to obtain each school-leaving certificate via second-chance education (zweiter Bildungsweg, explained in Chapter 2.5: Continuing Education). The admission requirements for different educational levels vary among the member states: either the parents, the primary school or a school supervisory authority make admissions decisions³⁷ (KMK, 2015a). While all member states agreed on comparative examinations in 2008, assessments are determined by each school individually (OECD, 2014c).

2.3 Upper secondary Education

Upper secondary education marks the beginning of two different educational paths: an academic path and a vocational path. In 2014, the share of graduates from the academic path (with a general higher education entrance qualification) was 41.0 percent, ranging from 31.4 to 55.8 percent in different member states (Destatis, 2016a).

VET offers several education programs in different occupations. The Chamber of Industry and Commerce (KMK, 2015a) regulates the companies providing dual and work-based VET. Additionally, part-time compulsory VET for the 15/16 to 18/19-year-olds can replace³⁸ full-time compulsory lower secondary education (Vossenkuhl, 2010). VET (transitional, school-based and dual) is explained more thoroughly in Chapter 3.1: Vocational Education and Training.

The upper level of grammar school (Gymnasiale Oberstufe) seamlessly adjoins to the lower secondary level grammar school³⁹: while the curriculum content does not change notably, it is taught more comprehensively and scientifically (KMK, 2015a). At the end of upper level grammar school, students take the *Abitur* examination⁴⁰ to qualify for entrance into general higher education or comparable VET program (ibid).

³⁶ After finishing the upper level of grammar school (Gymnasiale Oberstufe, explained in chapter 2.3 Upper secondary education).

³⁷ An overview of the varying regulations can be found here:

http://www.kmk.org/fileadmin/Dateien/veroeffentlichungen_beschluesse/2015/2015_02_19-Uebergang_Grundschule-SI-Orientierungsstufe.pdf (Übergang von der Grundschule in Schulen des Sekundarbereichs I und Förderung, Beobachtung und Orientierung in den Jahrgangsstufen 5 und 6, assessed May 24, 2016).

³⁸ Pupils staying at grammar school continue to get a full-time general education.

³⁹ In the school year 2014/15, 93.1 percent of the pupils at the upper level of grammar school transferred from the lower level, whereas only 4.2 percent came from an intermediate secondary school and 2.7 percent from other schools (Destatis, 2016a).

⁴⁰ "The questions are either set on a uniform basis by the Ministry of Education and Cultural Affairs of a Land or drawn up by the teachers of the individual schools and approved by the responsible school supervisory authority." (KMK, 2015a, p. 135)

A similar educational path involves full-time vocational grammar school (Berufliches Gymnasium), which in contrast to the general education at the upper level grammar school, additionally offers career-oriented subjects including business, computer science, health and social studies (ibid).

2.4 Postsecondary / Higher Education

Specialized upper secondary schools (Fachoberschule) and higher vocational schools (Berufsoberschule), in contrast to school-based VET programs, are classified per ISCED 2011 as postsecondary / non-tertiary. Germany, however, allocates them to upper secondary education (KMK, 2015a). Both schools, offering vocationally-oriented general education that grants access to higher education institutions, will be explained in Chapter 3.1: Vocational Education and Training (Graf, 2013).

At the tertiary level, the main educational facilities⁴¹ include the universities (Universität), as well as equivalent institutions of higher education⁴², and the universities of applied science (Fachhochschule, UAS; KMK, 2015a). While all institutions of higher education follow the Humboldtian model of higher education⁴³ and prepare students for a profession, universities place more emphasis on basic and theoretical research, whereas UAS bring the practical application of knowledge into focus (ibid). This is also evident in the admission regulations: while the general higher education entrance qualification⁴⁴ entitles one to study at any institution of higher education, the UAS entrance qualification (Fachhochschulreife, obtained at vocational school) permits students to only enroll at UAS (ibid).

Tertiary level education is in great demand: in the school year 2014/15, 65.5 percent of all tertiary (higher education) students were enrolled at universities and 34.5 percent at UAS (Destatis, 2015c). Whereas the number of students enrolled at universities increased since the German reunification, the number of students enrolled at UAS has comparatively skyrocketed (see Figure 5).

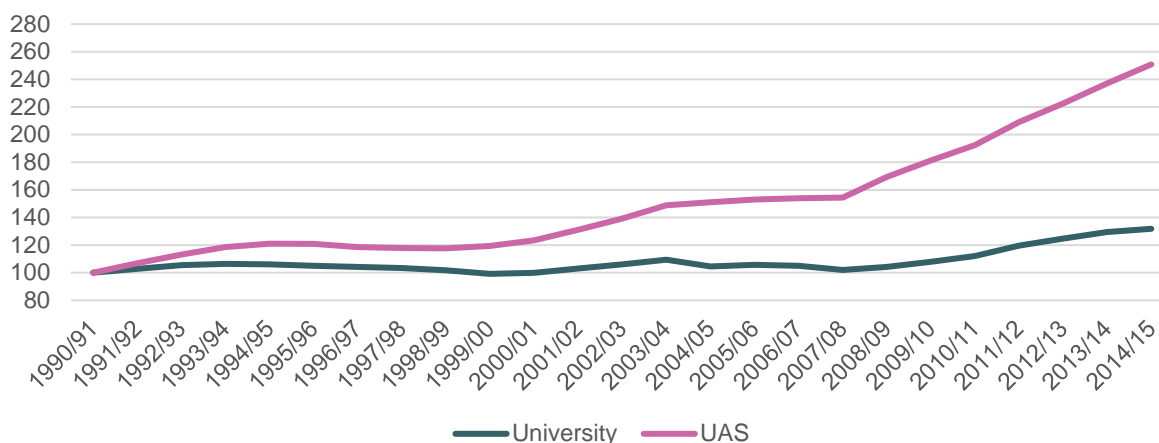
⁴¹ Other institutions are the trade and technical schools (Fachschulen) and vocational academies (Berufsakademien).

⁴² Technical, pedagogical and theological universities and colleges of art and music (KMK, 2015a).

⁴³ Unity of teaching and research.

⁴⁴ The higher education entrance qualification is divided into a general and specialized qualification. The former permits student to enroll in any subject, while the latter only in subject-related fields. An exception presents the nationwide quotas for medicine, veterinary medicine, dentistry and pharmacy (KMK, 2015a).

Figure 5: Enrolment by institutions of higher education⁴⁵ (Index 1990/91 = 100)



Source: Own illustration, (Destatis, 2015c).

The cost of tertiary education in 2012, which was € 33.6 billion⁴⁶, was mainly funded by the member states (66.2 percent), followed by the Federation (17.3 percent) and the private sector (14.0 percent) (Destatis, 2015a). Although tuition fees play a minor role in financing the educational system, they remain a controversial topic. The KMK prohibited universities and UAS to charge enrolment fees in 2001, but in 2005 the German Federal Constitutional Court declared the prohibition void due to incompatibility with the German Basic Law. Despite the verdict, most member states waive enrolment fees or demand little (Studis Online, 2016).

In alignment with the Bologna Process, Germany largely completed the introduction of a consecutive tripartite structure of study. The first cycle of tertiary study generally lasts six semesters and results in a Bachelor’s degree. The second cycle of study generally lasts four additional semesters (altogether ten semesters or 300 ECTS) and leads to a Master’s degree. The third cycle, a doctorate⁴⁷, is the first step in a career in academia (KMK, 2015a).

2.5 Continuing Education (Adult Education)

Based on the target of lifelong learning, continuing education institutions provides adults with the opportunity to specialize in a familiar domain and obtain secondary level education qualifications (KMK, 2015a). The educational landscape of continuing training features a low regulation density⁴⁸ to preserve the diverse and competitive structure required by the rapidly-

⁴⁵ Students of colleges of art and music are accounted to the universities.

⁴⁶ The amount contains € 14.0 billion (41.7 percent) for research and development at institutions of higher education (Destatis, 2015a).

⁴⁷ Only universities are legally entitled to award a doctorate.

⁴⁸ The member states are mainly obliged to define principles and regulate organisational and financial issues.

changing demands of the German economy (ibid). In most member states, paid educational leave (usually five days per year) is established by law for employees (KMK, 2016c).

The second-chance education (zweiter Bildungsweg) enables adults to catch up on missed school-leaving qualifications through either evening classes (Abendhauptschulen, Abendrealschulen and Abendgymnasien) or fulltime studies during the day (Kolleg). Classes take two to six semesters and lead to the same degrees as their regular counterparts (KMK, 2015a). In the school year 2014/15, approximately 53,000 adults⁴⁹ were enrolled in a second-chance education institution, compared to over 5 million students attending regular secondary level education institutions (BMBF, 2015a).

2.6 Teacher Education

Types of teacher education can be divided into three categories: early childhood education and care, compulsory education and higher education. Different educational priorities are identified for each category. With increasing age of the students, the teachers' knowledge in specific subjects increases in importance. Alternatively, pedagogical expertise is most vital in early education.

Early childhood education and care workers⁵⁰ usually attend two- to three-year trainings at full-time vocational schools⁵¹ (KMK, 2015a) with focuses on educational, developmental-psychological and social-scientific foundations (KMK, 2010a).

Education for teachers at compulsory school is split into six paths: The typology differs between school levels (primary, lower secondary, upper secondary or a combination) and the special needs of students (KMK, 2015a). The education is divided into two stages, regardless of path: theoretical courses at higher education institutions and practical formations at teacher training institutes. The first phase usually last between seven to ten semesters and leads to the First State Examination (Erste Staatsprüfung). The curriculum focuses on subject areas for the respective teaching career, subject-related didactics and examinations and assessment procedures. Subsequently, after a two to four semester long preparatory service (Vorbereitungsdienst), students qualify for a teaching position by passing the Second State

⁴⁹ 61.9 percent at Abendgymnasien/Kollegs for the general higher education entrance qualification, 36.2 percent at Abendrealschulen for the intermediate school-leaving certificate and 1.9 percent at Abendhauptschulen for the lower secondary school-leaving certificate.

⁵⁰ State-recognised youth or child-care workers (Erzieher), youth and community workers (Sozialpädagogen) and nursery assistants (Kinderpflegerinnen).

⁵¹ Trade and technical schools, universities of applied science and full-time vocational schools.

Examination (ibid). In the school year 2014/15, a total of 783,500 teachers worked in compulsory schools⁵² (Destatis, 2015d).

Academic staff in higher education qualifies through scientific merits. Higher education degree programs (courses at the master or PhD level) and outstanding academic works (master thesis, doctorate and habilitation treatise) build the basis for a professorship appointment. Pedagogical suitability is required, but not formally assessed (DAAD, 2015).

3. The System of Vocational and Professional Education and Training

This section of the Factbook describes the vocational education and training (VET) system at the upper secondary level and the professional education and training system (PET) at the tertiary level. The term vocational and professional education and training (VPET) refers to both the VET and the PET systems.

3.1 Vocational Education and Training (VET; Lower and Upper Secondary Education Level)

VET in Germany is divided into three sectors: transitional VET, dual VET and school-based VET. In 2012, new VET entrants (967,294 students) were distributed as follows: 26.6 percent entered pre-vocational programs in transitional VET, 51.4 percent obtained a contract in dual VET system and 21.9 percent started a school-based VET program (DIPF, 2014).

3.1.1 Transitional VET (lower secondary)

Transitional VET aims to educate students in basic skills essential for the acquisition of vocational competences, and thus ease student placement in state-recognized VET programs (dual or school-based VET, §1 (2) BBiG). However, not all transitional VET programs provide students with VET qualifications; some courses count towards the formal training required for a recognized occupation or lead to a school-leaving certificate (KMK, 2015a).

Full-time VET schools expand upon previously acquired general knowledge and lead to lower secondary or intermediate school-leaving certificates, the latter only for students with a satisfactory final grade (3.0) and sufficient foreign language competences (KMK, 2013). In the school year 2012/13, 27.3 percent of all transitional VET students, who neither obtained a dual VET contract nor possessed a lower secondary diploma, attended full-time VET schools (UIS,

⁵² 191.6 thousand at primary schools, 469.8 thousand at secondary level general schools and 122.0 thousand at secondary level vocational schools (Destatis, 2015d). In 2013, the average class size in Germany was 21 at primary level and 24 at lower secondary level, identical with the OECD average (OECD, 2015c).

2015b). The one to two-year-long general education programs are taught at specialized vocational schools (Berufsfachschulen) and vocational schools (Berufsschulen).

Pre-vocational training helps students to choose careers by introducing them to one or two occupational fields (KMK, 2010b). The instruction lasts for one year and is primarily offered on a full-time basis (CEDEFOP, 2007). In the school year 2012/13, 40 percent of all transitional VET students were enrolled in pre-vocational training programs at specialized vocational schools and vocational schools (UIS, 2015b). Of those, 19 percent took vocational preparation training measures (Berufsvorbereitende Bildungsmaßnahmen) offered by the Federal Employment Agency (Bundesagentur für Arbeit; UIS, 2015b).

The basic vocational training year (Berufsvorbereitungsjahr) imparts general and occupational-field-related education on the student. If a student successfully completes the basic vocational training year, he can skip the first year of the 3-year lasting apprenticeship (or, equivalently dual VET program) (UIS, 2015b). In the 2012/13 school year, 32.8 percent of all transitional VET students received basic VET in occupational areas including metal technology, electrical engineering, business and public administration (ibid ;CEDEFOP, 2007).

3.1.2 Dual VET (upper secondary)

Dual VET, also referred to as apprenticeship, combines training in a company (three to four days per week) with classroom teaching in part-time vocational schools (up to two days per week) and leads to a state-recognized occupation, according to the Vocational Training Act (Berufsbildungsgesetz) and the Crafts Code (Handwerksordnung; CEDEFOP, 2007). The aim of dual VET is to impart upon students the vocational skills, knowledge and qualifications needed to carry out an occupation in a changing professional world (KMK, 2015a). Graduates additionally qualify⁵³ for specialized upper secondary schools (Fachoberschulen) as well as trade and technical schools (Fachschulen; UIS, 2015b).

Although no formal prerequisites are required for admission into dual VET, only 2.9 percent of all 525,897 new apprentices in this cohort⁵⁴, who entered a contract with a company in 2013, did not hold a secondary level school-leaving certificate (as seen in table 6; BIBB, 2015a). Dual VET typically lasts for three years. Of the 328 state-recognized occupations (BIBB, 2015b), only 27 involve VET lasting for only two years and only 52 involve VET lasting for three-and-a-half years (BIBB, 2015a).

⁵³ Furthermore, 7,003 apprentices (in 2012/13) were enrolled in programmes that qualified for a university entrance (UIS, 2015b).

⁵⁴ Information on 3,702 apprentices is missing.

Table 6: Apprentices with new training contracts and the top five frequently chosen occupations across highest school certificate in 2013

w/o diploma	Lower secondary (Hauptschulabschluss)	Intermediate (Realschulabschluss)	General HE entrance (Allg. Hochschulreife)
15,171 (2.9%)	153,966 (29.5%)	221,121 (42.3%)	131,934 (25.3%)
Salesperson 1,005 (6.6%)	Salesperson 13,674 (8.9%)	Retail dealer 15,141 (6.8%)	Industrial management assistant 12,411 (9.4%)
Gardening worker 552 (3.6%)	Retail dealer 10,536 (6.8%)	Office assistant 10,035 (4.5%)	Banker 9,249 (7.0%)
Retail dealer 543 (3.6%)	Automotive mechatronics engineer 7,596 (4.9%)	Automotive mechatronics engineer 9,810 (4.4%)	Assistant in wholesale and foreign trade 7,359 (5.6%)
Hairdresser 459 (3.0%)	Hairdresser 6,918 (4.5%)	Medical assistant 8,811 (4.0%)	IT specialist 6,042 (4.6%)
Painter and varnisher 453 (3.0%)	Plumbing and heating installer 5,955 (3.9%)	Salesperson 8,643 (3.0%)	Office assistant 5,841 (4.4%)

Source: Own illustration, based on BIBB (2015a) – Information on 3,702 apprentices is missing.

Dual VET is most popular in trade and industry, followed by craft (see Table 6). In public service, most apprentices hold higher school-leaving certificates (intermediate school-leaving certificate (completion of 10 years at school; “Realschulabschluss”) or higher education entrance qualification (12/resp. 13 years of schooling; “Abitur”). In contrast, the majority of apprentices in the craft, agriculture and home economics sectors hold lower school-leaving certificates (9 years of schooling; “Hauptschulabschluss”). The proportion of women and foreigners also varies considerably across the sectors.

Table 7: Apprentices (and new training contracts) across sectors and highest school certificate in 2013

	Total	Trade and industry	Craft	Public service	Agriculture	Liberal professions	Home economics
Total apprentices	1,391,889 (100.0%)	825,156 (59.3%)	381,387 (27.4%)	34,932 (2.5%)	33,585 (2.4%)	109,443 (7.9%)	7,386 (0.5%)
Prop. of women	38.6%	38.1%	22.0%	65.0%	21.9%	93.7%	91.9%
Prop. of foreigners	5.7%	5.1%	6.7%	2.0%	0.9%	9.8%	6.1%
New contracts	525,897 (100.0%)	317,694 (60.4%)	139,320 (26.5%)	12,174 (2.3%)	13,278 (2.5%)	40,782 (7.8%)	2,649 (0.5%)
w/o diploma	15,171 (2.9%)	7,500	5,337	42	1,143	348	798
Lower secondary	153,966 (29.5%)	72,498	68,229	411	4,692	6,708	1,425
Intermediate sec.	221,121 (42.3%)	136,812	51,318	5,559	4,977	22,092	363
General HE entrance	131,934 (25.3%)	98,268	13,926	6,150	2,391	11,154	48

Source: Own illustration, based on BIBB (2015a) – Information on 3,702 apprentices is missing.

The training companies⁵⁵ are contractually committed to impart the designated professional competences according to the federal VET regulations (Ausbildungsordnung) of the respective state-recognized occupation (CEDEFOP, 2007). To achieve this, the Vocational Training Act stipulates that training companies must be appropriate by body and by type (§27ff BBiG). Furthermore, the number of apprentices must be in reasonable proportion to employed specialists with the necessary personal and professional skills, knowledge and qualification to instruct (ibid). Because small and medium-sized enterprises experience difficulties in providing the entire learning content, on-the-job training might (additionally) be provided in so-called inter-company courses (überbetriebliche Berufsbildungsstätten) or by training alliances between several companies (Ausbildungsverbände, ibid).

Vocational schools (Berufsschulen) are autonomous places of learning and build the second part of the dual VET system (BIBB, 2015a). The aim of vocational school is not only to teach specialized vocational skills, but also enable apprentices to shape the world of work and society (ibid). Under the terms of a KMK resolution, training in vocational schools should be at least 12 hours a week, whereby VET should last eight hours and general education⁵⁶ (German, social studies and economics, religion and sport) four hours a week, independent of the training area (CEDEFOP, 2007).

In dual VET, apprentices take both an intermediate (halfway through their training) and a final examination⁵⁷ according to the training regulations and framework curricula (Rahmenlehrpläne) of the respective state-recognized occupation (KMK, 2015a). The responsible authorities administer both examinations (ibid), while the board of examiners consists of an equal number of representatives of industry and labor, and at least one vocational school teacher (§40, BBiG).

3.1.3 School-based VET (upper secondary)

Full-time school-based VET is taught in VET schools that fully qualify students to enter specific state-recognized occupations or vocationally oriented general education schools that grant access to higher education institutions (Graf, 2013). While full-time vocational schools (Berufsfachschulen) and schools in the health-care sector (Schulen des Gesundheitswesens) prepare students for the former, specialized upper secondary schools (Fachoberschule) and higher vocational schools (Berufsoberschule) prepare students for the latter. In the school year

⁵⁵ Apprenticeship places are provided in the private sector, the public service, practices of freelance professions and, to a lesser extent, private households.

⁵⁶ Foreign languages (e.g. English and French) are taught correspondingly to its importance in the respective career field.

⁵⁷ Journeyman take the journeyman's examination (Gesellenprüfung) instead.

2012/13, 543,932 students were enrolled in the previous mentioned VET schools (own calculation; UIS, 2015b).

Full-time vocational schools (Berufsfachschule) offer school-based two- to three-year programs for specific occupations with a final qualification equivalent to that of the dual VET system, but outside the vocational training act and the crafts code (UIS, 2015b). Since these schools mainly focus on specific occupations, they do not stand in direct competition with the qualifications in the dual VET system (Graf, 2013). The broadly-based range of programs include training for commercial, foreign linguistic, technical, home economical, artistic, health and social occupations (CEDEFOP, 2007). The prerequisite for admission is normally a lower level or intermediate school-leaving certificate (ibid). As in the dual VET system, all graduates are able to enter the labor market or to continue in specialized upper secondary schools or trade and technical schools (UIS, 2015b). In the school year 2012/13, 18.3 percent of all school-based VET students were enrolled in three-year programs (excluding health and social programs; ibid). From those, 41.2 percent were in their initial VET, 45.1 percent were on a track to also gain a university entrance qualification and 13.7 percent already held a university entrance qualification and were in their second VET program (ibid). Of these school-based VET students, 11.3 percent pursued a career in a social occupation (e.g. social assistant), 6.2 percent were being educated for a future health-care occupation (e.g. medical assistant, nurse or midwife), 3.6 percent were being trained as childcare workers and another 0.8 percent were enrolled in other health and social sector programs (ibid).

In addition to full-time vocational schools offering health-care programs, special schools in the health-care sector (Schulen des Gesundheitswesens) associated with hospitals train future (auxiliary) medical professionals (UIS, 2015b). In 2012/13, 1.9 percent of all school-based VET students were enrolled in short-term programs leading to an auxiliary occupation, while 25.4 percent were on track to become medical professionals (ibid). In the same year, the most preferred occupations per the graduate statistics were (geriatric) nurse, physiotherapist and members of rescue services (GBE, 2016).

Civil service training (Beamtenausbildung, mittlerer Dienst) educates future civil servants on the intermediate level (UIS, 2015b). The training requires an intermediate school-leaving certificate and takes place in institutions of public administration at all regional levels and also in special schools for public administration (ibid). As of 2012/13, 3.3 percent of all school-based VET students were enrolled in special programs for the intermediate level of civil service (ibid).

Specialized upper secondary schools (Fachoberschule) comprise grades 11 and 12, and qualify for an UAS entrance (CEDEFOP, 2007). The member states are allowed to establish a 13th grade, where students can obtain the specialized higher education entrance qualification (Fachgebundene Hochschulreife) and, with sufficient competence in a second foreign

language, the general higher education entrance qualification (KMK, 2015a). While the curriculum of the first year contains practical training in companies and courses in class, the focus of the second year is on general and specialized education⁵⁸ (ibid). The schools are divided into the disciplines business and administration, technology, health and social work, design, nutrition and home economics, as well as newer study fields such as agriculture or bio- and environmental engineering (ibid). The entry requirement for the two-year course is an intermediate school-leaving certificate (CEDEFOP, 2007). Students who have already completed an additional VET program may skip the first year (ibid). In 2012/13, 21.1 percent of all school-based VET students were enrolled in the former program, while 3.6 percent were enrolled in the latter (UIS, 2015b).

An alternative to the 12th and 13th grades of specialized upper secondary school is the higher vocational school (Berufsoberschule) in the member states Bavaria, Baden-Wuerttemberg and Berlin (CEDEFOP, 2007). Higher vocational schools provide two-year full-time education with similar fields of study as the specialized upper secondary schools (ibid). Students with an intermediate school-leaving certificate and two years of successful VET or at least five years of relevant professional experience are admitted to the program (ibid). Upon successful completion of higher vocational school, students obtain the specialized higher education entrance qualification and, with a second foreign language, the general higher education entrance qualification (KMK, 2015a). In 2012/13, 4.3 percent of all school-based VET students were enrolled in the two-year program (UIS, 2015b).

Besides vocationally oriented schools, which offer access to higher education for students with an intermediate school-leaving certificate, the vocational extension school (Berufsaufbauschule) equips students with a lower secondary school-leaving certificate. The prerequisite is an intermediate certificate from a VET program (administrative regulation of §2 Ausbildungsstätten, BAföG). In 2012/13, 0.1 percent of all school-based VET students were enrolled in the one to two-year program (UIS, 2015b).

3.2 Professional Education and Training (PET; Post-Secondary Level and Tertiary Level)

PET can be divided into two categories: advanced and higher professional education. While trade and technical schools (Fachschulen) as well as colleges of advanced professional studies (Berufsakademien) fall into the former, universities of applied science (UAS) belong to the latter. In the school year 2012/13 the distribution of students (1,037,561) in PET was as

⁵⁸ Education consists of German, foreign language, mathematics, natural sciences, economics and society and a field-specific subject (KMK, 2015a).

follows: 20.4 percent were enrolled in advanced professional programs (mainly in social, health-care and engineering) and 79.6 percent attended higher professional institutions (UAS), which are more science-oriented (mainly in law, economics, social and engineering sciences; UIS, 2015b; Destatis, 2015c).

3.2.1 Advanced professional education

Advanced professional education prepares students to take on management duties and promotes self-employment (KMK, 2015b).

Trade and technical schools provide advanced professional programs in the social and health-care, engineering, management, agriculture and design fields for students who have completed initial VET and gained relevant work experience⁵⁹ (KMK, 2015b). The programs last at least two years, but usually take three years including a professional practice year⁶⁰ (ibid). Qualified teachers (see 2.6 Teacher Education) or graduates of institutions of higher education with perennial work experience usually teach classes at trade and technical schools. Three-fourths to five-sixths of the school curriculum consists of specialized subjects, while interdisciplinary subjects compose the rest (ibid). In 2014, 62,788 students graduated from trade and technical schools after finishing a state examination⁶¹: 68.2 percent graduated with state-certified qualifications after attending state-run schools and 31.8 percent with state-recognized qualifications after attending private but officially recognized institutions (ibid; Destatis, 2015e). In addition to the professional qualification, graduates already holding intermediate school-leaving certificates are able to enroll at UAS (KMK, 2001).

Colleges of advanced professional studies build an alternative path and comprise both science-oriented and practice-related professional education at study institutions (Studienakademien) and companies in the member states Baden-Württemberg, Bavaria, Saxony, Thuringia and Berlin, thus constituting dual PET (CEDEFOP, 2007). In order to be accepted into the three-year fulltime education, students need a training contract with a company⁶² and a higher education entrance qualification⁶³ (ibid). In the school year 2012/13,

⁵⁹ Students must have completed a state-recognized occupational qualification according the vocational training act and the crafts code or equivalent and one year of work experience or must have completed vocational school and five years of work experience for programmes in engineering, management, agriculture and design. The field of social and health-care is further divided into social pedagogy / care work and therapeutic pedagogy: While the latter requires the former, the training in social pedagogy and care work requires students to have an intermediate school-leaving certificate or equivalent and a relevant occupational qualification.

⁶⁰ Programmes in engineering, management, agriculture and design last at least 2.400 hours (two years), while programmes in social and health-care last at least 3,600 hours (three years including 1.200 hours / one year practicing for social pedagogy and care work) or at least 1,800 hours (one and a half year for therapeutic pedagogy).

⁶¹ The examination must consist of a written test. Oral and practical exams are carried out according to the rules of the respective fields of study and the laws of the member states. (KMK, 2015b)

⁶² The enterprises pay for the on-the-job training and the wage for the students, which they also receive during the training in the study institutions.

⁶³ Depending on the regulations of the respective member state, this could be a general, a specialized higher education entrance qualification or an entrance qualification for UAS.

9,520 students were enrolled in colleges of advanced professional studies, many majoring in business, technology and social work (UIS, 2015b; CEDEFOP, 2007).

Table 8: Trade and technical school graduates across faculties and top three professional categories or *occupations* in 2014

Social and health-care	Engineering	Management	Agriculture	Design
26,022 (41.9%)	21,574 (34.7%)	10,019 (16.1%)	3,288 (5.3%)	1,200 (1.9%)
<i>Teacher</i> 16,202 (62.3%)	Machine and vehicle technology 8,867 (41.1%)	Law and administration 5,640 (56.3%)	<i>Agricultural manager</i> ⁶⁴ 1,900 (57.8%)	Marketing 829 (69.1%)
<i>Care worker</i> 2,540 (9.8%)	Mechatronics, energy and electro technology 5,249 (24.3%)	Management and organization 1,422 (14.2%)	<i>Horticultural manager</i> 346 (10.5%)	Product design and artisan craftwork 238 (19.8%)
<i>Rehabilitation nurse</i> 1,760 (6.8%)	Plastics and wood processing 1,196 (5.5%)	Sales, trading and purchasing 1,174 (11.7%)	<i>Agricultural engineer</i> 267 (8.1%)	Music and wardrobe mastering 133 (11.1%)

Source: Own illustration, based on Statistisches Bundesamt (2015e) – Information on 685 students is missing.

3.2.2 Higher professional education

Higher professional education prepares students to apply basic scientific methodology and special knowledge in their future professional practice, resulting in a career-qualifying degree (§20, Muster-Rahmenordnung FH).

Universities of applied science (Fachhochschulen, UAS) were established in the 1970s as alternatives to universities, with a practice-oriented bias in teaching and research (KMK, 2015a). UAS distinguish themselves from universities in the study structure: the standard period of study for a bachelor's degree⁶⁵ is eight semesters (compared to six at universities; §1, Muster-Rahmenordnung FH) and usually features an integrated semester of practical training (KMK, 2015a). In the practical training semester (Praktisches Studiensemester), students have to work in a company for at least 20 weeks – the UAS regulates the content of this training period and provides necessary support by appropriate courses (§2, Muster-Rahmenordnung FH). Like other PET institutions, professors at UAS are not only academically qualified, but also gained professional work experience (KMK, 2015a). In the school year 2014/15, 896,187 students were enrolled in the 215 UAS (as seen in table 9, *ibid*).

⁶⁴ Aggregation of agricultural (business) managers and masters.

⁶⁵ UAS adapted approximately 96 percent of all degree courses to a consecutive tripartite structure of study (albeit they are only able to offer the first two levels). The duration of study (eight semesters) goes back to the former final degree, called diploma. (KMK, 2010c)

Table 9: Students at University of Applied Science across fields of study, 2014/15

	All students	Male students	Foreign students
University of Applied Science (Total)	896,187 (100.0%)	525,758 (58.7%)	39,227 (4.4%)
Law, economics and social sciences	363,900 (40.6%)	164,400 (45.2%)	19,685 (5.4%)
Engineering sciences	306,305 (34.2%)	241,451 (78.8%)	9,906 (3.2%)
Mathematics and natural sciences	103,959 (11.6%)	78,733 (75.7%)	4,300 (4.1%)
Medicine and health sciences	41,703 (4.7%)	10,971 (26.3%)	1,329 (3.2%)
Linguistic and cultural studies	30,322 (3.4%)	7,845 (25.9%)	1,432 (4.7%)
Art and art studies	26,200 (2.9%)	10,322 (39.4%)	1,753 (6.7%)
Agriculture, forestry and nutrition sciences	23,024 (2.6%)	11,535 (50.1%)	732 (3.2%)
Sport science	546 (0.1%)	381 (69.8%)	3 (0.5%)
Others	228 (0.0%)	120 (52.6%)	87 (38.2%)

Source: Own illustration, based on Statistisches Bundesamt (2015c).

While private UAS slightly outnumber state-maintained UAS, only about one out of seven first-year students chose a private institution (KMK, 2015a; DIPF, 2014). Although private UAS are largely subject to the same legal provisions, they distinguish themselves by offering limited courses specially tailored to the needs of working people and the economy, including the opportunity of distance-learning (KMK, 2015a; DIPF, 2014). The prerequisite for admission is a higher education entrance qualification⁶⁶ and, depending on the program, study-related work experience (e.g. in the form of an internship; CEDEFOP, 2007). To encourage the permeability of the educational system, (a) graduates of trade and technical schools, (b) professionals with a state-recognized occupation and at least three years of professional experience and (c) students successfully concluding a state-run aptitude assessment procedure are able to apply to study at a UAS (KMK, 2009). Due capacity constraints, UAS restrict the number of students and allocate study spaces based on evaluation criteria including former educational institutions grades, capability-tests, interviews and the applicants' employment history (KMK, 2015a). As a result, more than 50 percent of all first-year students in 2004 would have also qualified for university (CEDEFOP, 2007).

UAS for public administration (Verwaltungsfachhochschule) are a special type of UAS and provide training for higher-intermediate level (Gehobener Dienst) careers within the public sector. In the school year 2014/15, 34,349 students were (mainly) enrolled in administrative or police / constitution protection science programs, qualifying for direct entry into civil service (Destatis, 2015e).

⁶⁶ Specialized higher education entrance qualification or entrance qualification for UAS.

3.3 Regulatory and Institutional Framework of the VPET System

3.3.1 Central Elements of VPET Legislation

The Federal Government and the Federal States of Germany share the responsibility to regulate the VPET system.

The Basic Constitutional Law (Grundgesetz, GG) states the economic and labor responsibilities of the Federal Government (Art. 74 Nos. 11 and 12). It implies the Federal Government is responsible for the work-based part of the VPET system. Art. 30 of the Basic Constitutional Law stipulates that the Federal States of Germany are in charge of regulating the school system at a federal level, including the school-based part of the VPET system (BIBB, 2009).

The principle statute for the work-based VPET is the Vocational Training Act (Berufsbildungsgesetz, BBiG). In addition, the Craft's Trade Code (Handwerksordnung, HwO), the Regulation on Trainer Aptitude (Ausbilder-Eignungsverordnung, AEVO), the Distance Learning Courses Act (Fernunterrichtsschutzgesetz, FernUSG), the Safety at Work for Young Workers Act (Jugendarbeitsschutzgesetz, JArbSchG), the Work Council Constitution Act (Betriebsverfassungsgesetz, BetrVG) and the Staff Representation Act (Personalvertretungsgesetz, PersVG) are relevant for the VET system. In addition to the aforementioned acts, the Federal Training Assistance Act (Bundesausbildungsförderungsgesetz, BAföG) and the Aid for Further Training for Advancement Act (Aufstiegsfortbildungsförderungsgesetz, ABFG) are important for the PET system (CEDEFOP, 2007).

The Craft's Trade Code has the character of a principle statute. It partly replaces the Vocational Training Act for craft training occupations in its purview. The Work Council Constitution Act and the Staff Representation Act give the trade unions a considerable say in the VET system (BIBB, 2009). The Federal Training Assistance Act regulates student loans for students at secondary schools and universities while the Aid for Further Training for Advancement Act provides the statutory basis for financial support of vocational career advancement training.

Comprehensive information on the statutes of the VPET system in Germany can be viewed in the appendix.

3.3.2 Key Actors

VPET in Germany features a close cooperation between employers, trade unions and the government in order to meet the demands of the labor market and society. Social dialogue and codetermination play a vital role in VPET reforms (Hensen-Reifgens & Hippach-Schneider, 2014).

a) Vocational Education and Training

Government

The **Federal Ministry of Education and Research** (BMBF) is responsible for in-company, out-of-school VET and coordinates general VET policy issues (CEDEFOP, 2007; Hensen-Reifgens & Hippach-Schneider, 2014). Policy issues includes among others the vocational training act (BBiG), the annual VET report and the National Report on Education as well as the creation and modernization of existing state-recognized VET programs (ibid; BMBF, 2015b).

The BMBF delegates the development of VET program profiles to a subordinate institution called **Federal Institute for Vocational Education and Training** (CEDEFOP, 2007). The BIBB is the federal center of excellence in terms of VPET research and development (BIBB, 2016a) and works as a national facilitator between employer and employee representatives as well as the government⁶⁷ (Hensen-Reifgens & Hippach-Schneider, 2014). The recognition of VET occupational programs and issuance of training regulations is the responsibility⁶⁸ of the **Federal Ministry for Economic Affairs and Energy** (BMWi; ibid).

The curriculum development of the in-school VET is the responsibility of the **Ministries of Education and Cultural Affairs** of the member states.

In terms of harmonizing education policies, the Ministries of the 16 member states cooperate in a Standing Conference of Ministers for Education and Cultural Affairs (KMK). The KMK defines a recommended⁶⁹ framework curricula (Rahmenlehrpläne), aligning with vocational training regulations. On this basis, the Ministries of Education and Cultural Affairs of the member states (along with employer and employee representatives) develop the educational curriculum in its vocational schools (CEDEFOP, 2007)

Social partners and competent bodies

The Vocational Training Act assigns the supervision of VET to the Chambers of Industry and Commerce, the Chambers of Crafts or the appropriate professional boards for the liberal professions, and calls them **competent bodies** (zuständige Stellen; §76, BBiG). The duty of the competent bodies includes advising companies, ensuring the professional aptitude of trainers, registering apprentices, conducting examinations and awarding certifications (CEDEFOP, 2007). In addition, competent bodies establish a tripartite **vocational training committee** (Berufsbildungsausschuss) consisting of six employers' representatives and six

⁶⁷ The Federal Government and the member states.

⁶⁸ 303 of 327 state-recognized occupational programs falls under the responsibility of the BMWi (BMWi, n.d.). In all cases, an approval by the BMBF is required (Hensen-Reifgens & Hippach-Schneider, 2014).

⁶⁹ KMK decisions are recommendations and only become legally binding when passed by the legislative body of the member states (Hensen-Reifgens & Hippach-Schneider, 2014).

employees' representatives as well as six vocational school teachers assuming a consulting function (§77, BBiG). At the sectoral level within the social partnership, **employers' associations** (Arbeitgeberverbände) and **trade unions** further negotiate apprenticeship remunerations within collective bargaining and the supply of training places (CEDEFOP, 2007).

Education and training providers

Education and training is provided by training companies and vocational schools (dual VET) or by specialized vocational schools (school-based VET). In 2011, 21.7 percent of all companies in Germany provided VET according to vocational training regulations for apprentices, hosting one apprentice in 18 employees (Destatis, 2013).

b) Professional Education and Training

Government

In advanced PET, the Federal Republic of Germany shares even more policy-making responsibilities with the competent bodies. The competent bodies join the BIBB and BMWi, which normally hold development and recognition responsibilities for PET programs, respectively. (§54, BBiG). The member states and their **Ministries of Education and Cultural Affairs** bear full responsibility of PET and have the writ of law (Gesetzgebungshoheit) for the institutions of higher education within their territory. Universities of applied science (UAS) are regulated by the member states' law for higher education institutions⁷⁰, while the legal mandate for trade and technical schools can be found in the member states' school law⁷¹.

The **Standing Conference of Ministers of Education and Cultural Affairs** (KMK) supports the member states by promoting mutual interest in terms of education and research (including PET) through consensus and co-operation among its members (KMK, n.d.). The KMK focusses on agreements for the mutual recognition of degrees and the assurance of quality standards (ibid). Another joint institute (of the member states) is the **Foundation for University Admissions** (Stiftung für Hochschulzulassung), which is mainly responsible for supporting higher education institutions in implementing admission procedures (§§1, GV. NRW. 2008 S. 710).

Representation and advisory bodies

⁷⁰ An overview of all laws concerning universities and UAS can be found here: <https://www.kmk.org/dokumentation-und-statistik/rechtsvorschriften-lehrplaene/uebersicht-hochschulgesetze.html> (14.07.2016)

⁷¹ An overview of all laws concerning trade and technical schools (and other schools) can be found here: <https://www.kmk.org/dokumentation-und-statistik/rechtsvorschriften-lehrplaene/uebersicht-schulgesetze.html> (14.07.2016)

The main representation and advisory bodies can be narrowed down to one⁷² institution each. The **German Rectors' Conference** (Hochschulrektorenkonferenz) is the voluntary association of state and state-recognized universities and other higher education institutions, acting as the voice of its members towards politics and the public as well as the forum for a joint opinion-forming process (HRK, n.d.). Together with the KMK, the German Rectors' Conference founded the **Foundation for the Accreditation of Study Programmes in Germany** (Stiftung zur Akkreditierung von Studiengängen in Deutschland, Akkreditierungsrat) to accredit higher education programmes via accreditation agencies (Gesetz zur Errichtung einer Stiftung "Stiftung zur Akkreditierung von Studiengängen in Deutschland"). The main advisory body regarding science policies is the **German Council of Science and Humanities** (Wissenschaftsrat) with a focus on the structure, efficiency, development and financing of academic institutions as well as comprehensive issues of the science system (WR, n.d.)

Education and training providers

Education and training is provided by trade and technical schools as well as colleges of advanced professional studies (advanced PET) and by UAS (higher PET). While the former state and state-recognized institutions prepare students to take on management duties in their future or to be self-employed (KMK, 2015b) the latter prepares students to apply basic scientific methodology and special knowledge in their future professional practice, and thus to a career-qualifying degree (§20, Muster-Rahmenordnung FH).

3.4 Educational Finance of the VPET System

Three parties finance the VPET system: the government, training companies and the students or apprentices. While the magnitude of the former two funding contributors can be calculated directly, the financing of apprentices and students (e.g. loss of income) is less straightforward (BIBB, 2016b). Tax revenues of the Federal Republic of Germany, the member states and the municipalities are used for school-based parts of the VPET while training companies pay the educational expenditures for in-company training (CEDEFOP, 2007).

3.4.1 Educational finance of the VET system

In 2011, educational direct expenditures for school-based and dual VET were € 18.8 billion, which is 10.7 percent of the total education cost: 41.5 percent of that by private institutions (mainly training companies) and 58.5 percent by the government (DIPF, 2014).

⁷² Although a large number of PET advisory bodies exist, they do not support the understanding of the German education system and the following sections.

While the member states pay for internal school affairs (e.g. teachers' and principals' salaries), municipalities finance external school issues (e.g. construction, maintenance and renovation of school buildings; CEDEFOP, 2007). The VET system cost can additionally be divided along the three educational sectors. Transitional VET, which includes supporting measures for the disadvantaged and structural funding, costs €2.5 billion. Dual VET, which goes mainly to part-time vocational schools, costs € 2,9 billion and school-based VET, which encompasses full-time vocational schools and schools in the health-care sector, costs € 4.0 billion (all numbers refer to the school year 2012/13; BIBB, 2016b).

In the dual VET system, involved training companies had expenditures amounting to € 7,7 billion (ibid). Each apprentice causes an average net cost of € 5,400 per year: while the gross cost was estimated at € 17,900⁷³, apprentices generated € 12,500 of income (Destatis, 2015a). The net cost (or profit) varies considerably among different state-recognized occupations: while mechatronics engineers generate a net cost of € 17,300, bakers create a net profit of € 3,200 (BIBB, n.d.).

3.4.2 Educational finance of the PET system

In 2014, expenditures for higher professional education (UAS including UAS for public administration) were €5.98 billion, corresponding to 0.2 percent of the nation's GDP (Destatis, 2016b). Therefore, each student results in costs of € 6,425 per year (own calculation; ibid; Destatis, 2015c). While the Federal Republic of Germany mainly funds research projects via special programs (e.g. Excellence Initiative, Higher Education Pact or Women Professors Program), the member states bear the school-based educational cost of higher professional education in principle (HRK, n.d.). In addition, while students face indirect costs (loss of income), there is no legal claim that companies have to remunerate students during (mandatory) practical training (OTH Amberg Weiden, n.d.).

A similar pattern occurs in the financing of advanced profession education. In 2013, expenditures for PET programs at the tertiary level⁷⁴ amounted to € 1.03 billion, which is 0.04 percent of the GDP (DIPF, 2016). The government, mainly the member states, bore 81.6 percent of the costs while the private sector contributed the remaining 18.4 percent (ibid).

Not only do most member states waive enrolment fees or demand relatively small amounts (Studis Online, 2016), the Federal Republic of Germany (via BMBF) also provides need-based funding for students to foster PET (e.g. € 348 per month for trade and technical schools; §13 BAföG).

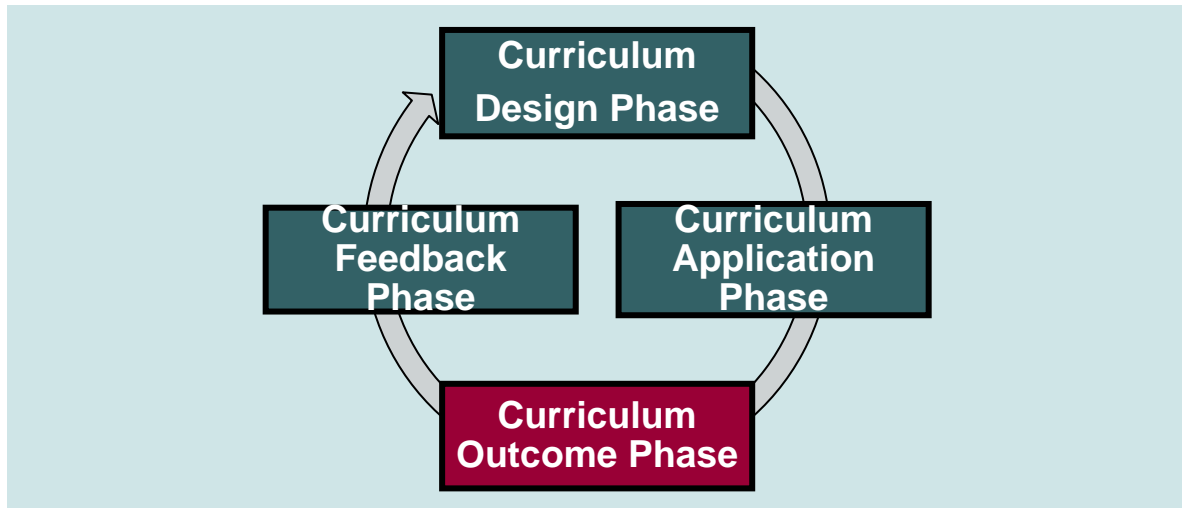
⁷³ The annual cost of € 17.900 break down as follows: € 11.000 for the apprentice' wage, € 4.100 for the trainers' wage, € 900 for equipment and material as well as € 1.900 for other expenditures (Destatis, 2015a).

⁷⁴ The National Report on Education counts the UAS to academic programs.

3.5 Curriculum Development

The curriculum is a central element for the functioning of a VPET system by defining the framework and the standards for the education system. The development of a curriculum can be decomposed into a three-step process of curriculum design, application and feedback. This theoretical concept is called the Curriculum Value Chain and is depicted in the picture below (CVC; for more details see; Bolli, et al., 2016)

Figure 6: Curriculum Value Chain (CVC)



Source: (Bolli, et al., 2016).

In the curriculum design phase, VET curriculum content and qualification standards are decided upon by the relevant actors. The discussion in the subchapter below focuses on the degree and the amount of stakeholder participation concerning curriculum design in Germany. The curriculum application phase revolves around the implementation of the curriculum. Because learning environments differ heavily across countries – especially with respect to the prevalence of workplace learning – the curriculum application subchapter in this Factbook focuses on those learning environments. Specifically, it addresses where learning takes place and whether the curriculum dictates both school and workplace learning or only one of the two. Finally, curriculum outcomes can be collected and analyzed in the curriculum feedback phase. This evaluation process is important as the feedback may render a more refined curriculum design.

3.5.1 Curriculum Design Phase

In order to ensure that the skills taught in the VPET programs correspond to the needs of the labor market, experts from companies should be involved in defining the qualification standards and learning contents of the curricula.

The legal foundation for VPET is the Vocational Training Act (BBiG). Aligned with the BBiG, the Federal Institute for Vocational Education and Training (BIBB) develops state-recognized VPET occupational programs⁷⁵ with employer and employee representatives, leading to labor market need-based vocational (and professional) training regulations (CEDEFOP, 2007; Hensen-Reifgens & Hippach-Schneider, 2014).

Vocational training regulations specify the designation of the occupation, the duration of the program, the vocational skills, knowledge and qualifications to be imparted during dual VET (in vocational schools and training companies), as well as the outline of the syllabus, timetable, and examinations requirements (§5, BBiG). The vocational training regulation for automotive mechatronics engineers for instance, stipulates that the program must last three and a half years and should impart the operation of vehicles and systems (§§1, Verordnung über die Berufsausbildung zum Kraftfahrzeugmechatroniker und zur Kraftfahrzeugmechatronikerin). In line with the vocational training regulations, vocational teachers develop in coordination with the government and representative bodies (institutionalized in the KMK) framework curricula as recommendations for the member states (KMK, n.d.). Framework curricula regulate the educational tasks of vocational schools as independent learning facilities in dual VET and define VET learning areas⁷⁶ for the apprentices. In contrast, each member state independently develops the learning areas for general knowledge (ibid). School-based VET programs have their legal basis in the member states' education laws, while the KMK established mutually adopted criteria for education standards (BMFB & KMK, 2013). Additionally, school-based VET programs leading to a state-recognized occupation (according to BBiG and craft code) are legally based on the same VET regulations and framework curricula as their dual VET counterparts (KMK, 2013).

Professional training regulations for advanced PET, on the other hand, are less focused on the training content than on the examination. Regulations include, beyond the designation of the occupation, the purpose, subject matter and requirement of the examination, both the conditions for the examination-admission and the examination procedure (§53, BBiG). Analogous to VET, the KMK develops the framework curricula for trade and technical schools as a recommendation towards the member states (KMK, 2015b). The framework curricula encompass compulsory and elective courses, the latter being regulated by the member states (ibid). A different approach is featured in the curriculum design phase of higher professional institutions: UAS are independently able to develop bachelors and masters programs, but all

⁷⁵ On the PET level, competent bodies are allowed to develop occupational programmes taught at trade and technical schools too (§ 54, BBiG).

⁷⁶ A learning area for automotive mechatronics engineers is the maintenance and inspection of vehicles and systems according to occupational standards (Rahmenlehrplan für den Ausbildungsberuf Kraftfahrzeugmechatroniker und Kraftfahrzeugmechatronikerin).

programs are currently⁷⁷ accredited by an accreditation agency, which itself is accredited by the Foundation for the Accreditation of Study Programs in Germany (KMK, 2010c).

3.5.2 Curriculum Application Phase

The way in which a curriculum is implemented – especially with respect to the learning environments – is important to achieve the intended learning outcome. As described in section 3.1.2, dual VET programs in Germany have a school- and an in-company based component. In contrast, school-based VET and PET programs are largely school-based, as described in section 3.1.3 and 3.2. In general, school-based education falls under the jurisdiction of the member states, while training companies bear the responsibility for in-company education.

In-company education may take place in different institutions. The main location for education is the training companies themselves (CEDEFOP, 2007). If small and medium-sized enterprises have problems in providing the entire learning content, they may found training alliances (Ausbildungsverbände) to share the educational obligation (ibid). Vocational skills and knowledge are imparted complementarily at central training facilities (überbetriebliche Berufsbildungsstätten), which are principally under the trusteeship of the competent bodies and receive investments grants by the BMBF (ibid). School-based education is taught at different schools, depending on the level: vocational schools (dual VET), full-time vocational schools (school-based VET), trade and technical schools (advanced PET) and universities of applied science (higher PET).

3.5.3 Curriculum Feedback Phase

The curriculum feedback phase deals with the question of whether or not and how educational outcomes are analyzed. Based on the feedback, curriculum can be re-worked and improved.

According to the BBiG, vocational training committees of the competent bodies and the Ministries of Education and Cultural Affairs of the member states have to strive for constant development in the quality of VPET (§§79/83, BBiG). On a national level, the BMBF provides the annual VET report and the National Report on Education (BMBF, 2015b), while the BIBB frequently publishes VPET research reports (BIBB, 2016a). Furthermore, basal information is brought together in the annual VET statistics (Berufsbildungsstatistik) by the Federal Statistical Office (Statistische Bundesamt, §87f, BBiG).

⁷⁷ See chapter 3.5.3 Curriculum Feedback Phase.

The development or redesign of an existing VET program profile falls under the remit of the BIBB⁷⁸ (CEDEFOP, 2007). Over the past 20 years⁷⁹, the BIBB developed 84 new⁸⁰ programs and modernized 330 dual VET programs in collaboration with the social partners and experts from day-to-day practice in actual enterprises (BIBB, 2016c). The education of automotive mechatronics engineers for instance, was last revised in 2013 (ibid). The quality assurance task of the educational execution, in contrast, falls with the competent bodies (on site; BIBB, 2016d). The competent bodies make decisions regarding the aptitude of training companies and trainers, review training contracts, conduct examinations and award state-recognized occupation qualifications on the dual VET and advanced PET level (ibid).

In 2016, the German Federal Constitutional Court declared the obligation to accredit all study programmes of higher education institutions void due to incompatibility with the German Basic Law: the freedom of science was valued higher than the assurance of quality (1 BvL 8/10, BVerfG). Despite this judiciary decision, quality assurance plays an important role in higher education. The Foundation for the Accreditation of Study Programs in Germany accredits (via accreditation agencies) study programs every seven years and the institutions' internal quality system every eight years (Akkreditierungsrat, 2013). The internal quality system controls the evaluation of teaching and learning, as well as the maintenance and improvement of it (ibid).

3.6 Supplying Personnel for the VPET System (Teacher Education)

The personnel of the VPET system can be divided along the educational level and the place of education. In VET, 'teachers' teach at vocational schools and 'trainers' train in training companies. In PET, 'teaching staff' teaches at trade and technical schools, while 'academic staff' teaches at UAS.

Teachers for vocational schools can be subdivided in teachers for classes in VET schools (VET schoolteachers) and teachers teaching vocational practice (CEDEFOP, 2007). While the former provides students with subject-specific theoretical knowledge and general education in the occupational context, the latter teaches subject-specific practical knowledge (ibid). Although both teach at vocational schools, their educational pathways differ. **VET schoolteachers** teach similarly to teachers at compulsory schools (as seen in chapter 2.6 Teacher Education), but must possess vocational experience (a VET qualification or at least 3 to 12 months of VET depending on the member state) prior to the start of the program (ibid).

⁷⁸ The driving force behind the decision process for the CVC is not formally written down. On logical grounds and based on the reviewed literature, I hypothesize that while the BIBB may draw attention to the problem, competent bodies possess the power to push development and redesign of the CVC forward.

⁷⁹ From 1996 to 2015.

⁸⁰ A dual VET programme is classified as new, if no predecessor occupation (according to BBiG and crafts code) is repealed (BIBB, 2016c).

VET teachers, on the other hand, are skilled workers with a VPET qualification (e.g. state-examined technicians or certified masters, *ibid*). In the school year 2014/15, 15.3 of all teachers were employed at vocational schools (e.g. including full-time vocational schools as well as trade and technical schools; Destatis, 2015d)

Trainers provide in-company training in order to impart apprentices with the knowledge and skills required for their occupation (CEDEFOP, 2007). While all trainers must be suitable personally and professionally, depending on the training company size, training may be the trainer's secondary job (§§28, BBiG; *ibid*). The aptitude to train must be examined by the competent body according to the Regulation and Trainer Aptitude (AEVO; *ibid*). In 2015, 647,322 employees carried out their function as trainers for 1,337,004 apprentices; therefore, a trainer supervises on average 2.1 apprentices (Destatis, 2016c).

Teaching or academic staff at trade and technical schools or at UAS must have a higher education qualification (CEDEFOP, 2007). Auxiliary teachers (teaching assistants) at trade and technical schools are likewise required to have a higher education qualification, but an exception is made if the applicant has completed a VPET program and has several years of work experience (*ibid*).

4. Major Reforms in the Past and Challenges for the Future

4.1 Major reforms

VPET was not the result of legal disputes, but rather the outcome of a long bargaining process between companies, social partners and government agencies (Weiss, 2013). Yet, the adoption of the vocational training act (Berufsbildungsgesetz, BBiG) in 1969 marks a milestone for the Germany VPET system (*ibid*). The original (1969) BBiG focused on

- the apprenticeship (explanation, content, commencement and termination)
- the organization of the VET system (trainers, occupations, examinations, supervision, PET, policies for disabled persons and preparation training)
- VET committees (competent bodies as well as federal and member states committees)
- VET research
- provisions on fines

To promote VPET, the Vocational Training Promotion Act (Berufsbildungsförderungsgesetz, BerBiFG) was adopted in 1981. The BerBiFG laid the foundations for Germany's Federal Institute for Vocational Training (Bundesamt für Berufsbildung, BIBB) and further improvements of the VPET system (*ibid*). The goal was to better coordinate and plan VPET (*ibid*).

To further impart young people with full occupational competences, enhance lifelong learning and sustainably secure Germany as an attractive business location, the Vocational Training Reform Act (Berufsbildungsreformgesetz, BerBiRefG) broadly amended and merged the BBiG of 1969 and the BerBiFG of 1981 (BMBF, 2005). As a result, the current BBiG was introduced in 2015. The changes essentially concerned:

- clarification of the responsibilities between the Federation and its member states
- recognition of temporary VET in foreign countries
- increase of flexibility for training regulations
- restructuring of the interface between vocational schools and training companies
- innovations in the examination system
- reduction of BBiG committees

In 2016, an evaluation concluded that the current BBiG creates a reliable and contemporary framework for the VPET system and there is no need for fundamental and systemic changes at the moment (BMBF, 2016a).

4.2 Major challenges

The high-performance business-oriented VPET system of Germany assumes a pioneering role on a European and international level (BMBF, 2016b). The sustainable securement of the attractive business location remains a constant challenge (ibid). Major challenges include the:

- demographically conditioned decline in the number of school leavers
- students' tendency towards academic education
- decline in the number of training companies due to an increased competition
- regional, sectoral and qualification fitting problems on the labor market
- educational integration of refugees and people with a migration background
- transition towards a digital economy

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Appendix: Regulatory Framework on Vocational Education and Training in Germany

Dimension	Explanation	Regulatory framework in the Netherlands	
I. Overall governance		Upper-secondary level	Post-secondary level
1. Principal statute	Reference and year of publication	Work-based training: - Vocational Training Act, BBiG (1969, reformed in 2005) School-based training: - Legislation of the Federal States of Germany i.e. in Berlin the School Act, SchuG	Work-based training: - Vocational Training Act, BBiG (1969, reformed in 2005) School-based training: - Legislation of the Federal States of Germany i.e. in Berlin the School Act, SchuG
2. Secondary statutes	Reference and year of publication	<ul style="list-style-type: none"> - Crafts Trade Code, HwO (1953, reformed in 1998) <i>For vocational training occupations governed by the HWO, the HWO partly replaces the BBiG</i> - Regulation on Trainer Aptitude, AEVO (1999, reformed in 2009) - Safety at Work for Young Workers Act, JArbSchG (1960, reformed in 1976) - Works Council Constitution Act, BetrVG (1952, reformed in 2001) - Staff representation Act, PersVG (1994) <i>Both, the BetrVG and the PersVG give trade unions a say in the VET</i> 	<ul style="list-style-type: none"> - Crafts Trade Code, HwO (1953, reformed in 1998) <i>For vocational training occupations governed by the HWO, the HWO partly replaces the BBiG</i> - Federal Training Assistance Act (BAföG) (1971) <i>Regulates student loans for students at secondary schools and universities</i> - Aid for Further Training for Advancement Act, AFBG (1996, reformed in 2016) <i>Provides the statutory basis for financial support of vocational career advancement training.</i>

		<ul style="list-style-type: none"> - Distance Learning Courses Act, FernUSG (1976, reformed in 2000) 	<ul style="list-style-type: none"> - Social Security Code III, SGB III (1998) <i>Defines benefits and measures for the promotion of vocational further education. Provides the statutory basis for the Federal Employment Agency (Bundesagentur für Arbeit, BA)</i> - Safety at Work for Young Workers Act, JArbSchG (1960, reformed in 1976) - Works Council Constitution Act, BetrVG (1952, reformed in 2001) - Staff representation Act, PersVG (1994) <i>Both, the BetrVG and the PersVG give trade unions a say in the PET</i> - Distance Learning Courses Act, FernUSG (1976, reformed in 2000) - Legislation of the Federal States of Germany
3. Responsible ministry		<ul style="list-style-type: none"> - Federal Ministry of Education and Research (BMBF) - Federal Ministry for Economic Affairs and Energy (BMWi) - Federal Ministry for Labour and Social Affairs (BMAS) - Federal Ministry of Food and Agriculture (BMEL) (§§ 4 and 5 BBiG) 	<ul style="list-style-type: none"> - Federal Ministry of Education and Research (BMBF) - Federal Ministry for Economic Affairs and Energy (BMWi) - Federal Ministry for Labour and Social Affairs (BMAS) - Federal Ministry of Food and Agriculture (BMEL) (§ 53 BBiG)
4. National organization			

a) Administration	Who is responsible for the nation-wide administration of VET/ PET?	- Federal Institute for Vocational Education and Training, BIBB (§ 90 BBiG)	- Federal Institute for Vocational Education and Training, BIBB (§ 90 BBiG)
b) Representation, advice	<p>Are there institutions representing groups such as</p> <ul style="list-style-type: none"> - the “social partners”, comprising the employees’ as well as the employers’ side, - vocational teachers, who submit expert opinions regarding VET/ PET to the competent bodies or exercise statutory powers? 	<ul style="list-style-type: none"> - BIBB Central Board (§ 92 BBiG) <i>Composed of:</i> Employers, employees and the Federal States as well as the Federation (§ 92 Abs. 4 BBiG) - Research Council (§ 94 BBiG) <i>Composed of:</i> Specialists in the area of vocational training research (see § 94 BBiG) <i>Advises the BBIB by means of opinion and recommendations in respect of the research program, the cooperation of other research institutions and the annual reports (§ 94 Abs. 1 BBiG)</i> - Disabled Persons Committee (§ 95 BBiG) <i>Composed of:</i> Organizations of disabled persons, employees, employers, Federal Employment Agency, statutory pension insurance scheme, statutory accident insurance scheme, private welfare organizations, vocational rehabilitation institutions, experts in the area of vocational education and training of disabled persons (§ 95 Abs. 2 BBiG). <i>Advises the BBIB with respect to its tasks in the area of vocational education and training of disabled persons. (§ 95 Abs. 1 BBiG)</i> 	<ul style="list-style-type: none"> - Standing Conference of Ministers for Education and Cultural Affairs (KMK) <i>Represents:</i> Federal States of Germany <i>The Standing Conference of Ministers for Education and Cultural Affairs is an important institution in terms of harmonizing education policies of the 16 Federal States</i>

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c) Mandatory representation of:	Do the three groups listed below have a say in the VET/ PET system, i.e. legally specified controlling and voting rights?		n/a
- Employers		Yes. (see 4.b)	
- Trade unions		Yes. (see 4.b)	
- Vocational teachers		Yes. (see 4.b)	
5. Number of training programs (VET/ PET)	Is there a number of officially recognized VET/ PET occupations/ programs?	Yes. Currently 328 training occupations are officially recognized (BIBB, 2015a). The Federal Ministry for Labour and Social Affairs (BMAS) and the Federal Ministry for Economic Affairs and Energy (BMWi) or such other ministry as may be competent, acting in agreement with the Federal Ministry of Education and Research (BMBF), may officially recognize training occupations by ordinance (§ 4 Abs. 1, BBiG).	n/a

<p>6. Are there general requirements VET/ PET programs have to fulfil?</p>	<p>Requirements which guarantee the quality of the training, i.e. not any kind of on-the-job training can be termed as VET or PET in the formal sense.</p>	<p>Yes. Initial training in a recognized training occupation may only be provided based on the initial training regulations (§ 4 Abs. 2 BBiG). (see also § 5 BBiG)</p> <p>The competent bodies supervise the provision of the initial vocational training. (§ 76 Abs. 1 BBiG). “Competent bodies” refer to the chambers (chamber of crafts and trades, chamber of industry and commerce, chamber of agriculture, chamber of lawyers, patent attorneys and notaries, chamber of public accountants and tax advisers, chambers of physicians, dentists, veterinarians and pharmacists), relevant bodies in the public service sector and relevant bodies for the purview of the churches and other religious communities established under public law.</p>	<p>n/a</p>
<p>7. Minimal skill level for admission to VET/PET</p>	<p>A secondary level school-leaving certificate for example</p>	<p>No minimal skill level is legally specified</p>	<p>Trade and technical schools (Fachschulen):</p> <p>Completion of initial VET and work experience (usually at least 1 year) in the relevant area (KMK, 2007).</p> <p>Master Craftsmen examination / certificate:</p> <p>Completion of initial VET in the relevant craft or completion of a recognized initial VET and multi annual work experience in the relevant craft. For further details see § 49 HwO.</p>

8. Training duration (years)	Is there a minimum training (VET/PET) program duration?	The initial training regulations specify the duration of initial training, which shall not be more than three or fewer than two years (§ 5 Abs. 1 BBiG).	Trade and technical schools: Field of: - Agriculture: 1200 lessons - Design: 2400 lessons - Engineering: 2400 lessons - Economy: 2400 lessons - Social and health-care: 3600 lessons (except orthopaedagogy: 1800 lessons) (KMK, 2007) Master Craftsmen examination / certificate: n/a
9. Is there a special sort of training contract for VET/ PET students? Does it guarantee the quality of the VET/ PET programmes, i.e. does it prevent misuse of the contracts for atypical employment relations? And if, what is the regulation guaranteeing this?	One form of misuse of training contracts could be when firms employ workers under a training contract which might be subject to lower hiring and firing regulations, tax exemptions, etc. To guarantee the quality of the VET/ PET training, a minimal skill level could be required.	Yes. Training employers shall conclude an initial training contract with the trainees (§ 10 BBiG). Amongst others, the contract document shall specify the nature, syllabus, timetable and purpose of the initial training, and in particular, the form of occupational activity for which initial trainings is to be provided (§ 11 BBiG) . § 14 BBiG specifies the obligations of training employers.	Trade and technical schools: n/a Master Craftsmen examination / certificate: n/a
II. Regulation of school-based education			

1. Education and Training Providers	Is the competence and capacity of education and training providers legally specified?	The Federal States are responsible for vocational schools. An important institution in terms of harmonizing education policies of the 16 Federal States is the Standing Conference of Ministers for Education and Cultural Affairs, KMK (CEDEFOP, 2007).	Trade and technical schools: The Federal States are responsible for the legislation of trade and technical schools Master Craftsmen examination / certificate: Yes. §§ 47 and 48 HwO
2. Mandatory (part-time) educational segment			
a) In general	Is there a mandatory classroom segment for apprentices in addition to the work-based training (dual system)?	Yes.	Trade and technical schools are school-based education only. Master Craftsmen examination / certificate: n/a
3. Shares of the different instruction segments			
a) In general	Is the share of the different instruction segments legally specified?	Yes (KMK, 2015).	Trade and technical schools are school-based education only. Master Craftsmen examination / certificate: n/a
b) Classroom/off-the-job instruction	What is the share of classroom/off-the-job instruction as % of total time spent in VET/ PET training?	25 – 30 % (12 hours a week) (KMK, 2015)	Trade and technical schools: 100 %

			Master Craftsmen examination / certificate: n/a
c) General education	Is the share of general education legally specified? What is the share of general education as % of classroom/off-the-job instruction?	33 % (4 hours) (KMK, 2015)	Trade and technical schools: 17 - 25 % (KMK, 2007) Master Craftsmen examination / certificate: n/a
4. Specific mandatory educational contents	Are there legally specified standards regarding the content of the classroom instruction segment?	Training in vocational schools shall be at least 12 hours a week, it consists of vocational education and general education (German language, foreign languages, politics or economics, religion and sports). The vocational education shall last 8 hours a week (KMK, 2015).	Trade and technical schools: n/a Master Craftsmen examination / certificate: The examination is subdivided in 4 parts: Practical skills (part 1), theoretical skills (part 2), management skills (part 3) and educational skills (part 4). § 45 HwO
5. Mandatory representation in the decision-making process about the content of VET/ PET training. Involvement of:	Are the following three groups involved in the decision-making process about the content of VET/ PET training?		
a) Employers		Employers are represented in: <ul style="list-style-type: none">- The Vocational Training Committee of the Competent Body (§ 77 BBiG)- The Central Board of the Federal Institute for Vocational Education and Training (§ 92 BBiG)	n/a
b) Employees		Employees are represented in:	n/a

		<ul style="list-style-type: none"> - The Vocational Training Committee of the Competent Body (§ 77 BBiG) - The Central Board of the Federal Institute for Vocational Education and Training (§ 92 BBiG) 	
c) Vocational teachers		<p>Vocational teachers are represented in:</p> <ul style="list-style-type: none"> - The Vocational Training Committee of the Competent Body. The teachers having the right to speak but not vote (§ 77 BBiG) 	n/a
6. Is the involvement of firms/employer associations in the process of curriculum development legally defined?	Yes/ No. if yes of whom and to what extent?	The curriculum is stipulated by initial Training regulations. Ordinarily the Federal Ministry for Economic Affairs and Energy (BMWi) or the Federal Ministry of Education and Research (BMBF) issue initial training regulations (§ 4 and § 5 BBiG), while the Federal Institute for Vocational Education and Training (BIBB) takes part in the drafting of initial training regulations (§ 90 BBiG). Employer associations and trade unions intensively contribute to the drafting of initial training regulations. This cooperation is generally known as the principle of consensus (BIBB, 2015b).	n/a
III. Regulation of work-based training			
1. Work-based training			n/a
a) Compulsory training	Does compulsory work-based training exist?	Yes (§ 2 BBiG).	
b) Providers	Is the competency and capacity of work-based training providers legally specified?	Yes. § 27-33 BBiG specify Training Premises and Training Staff.	

2. Content regulation	Who has the competency to regulate the content of the work-based training segments?	See II.6.	n/a
3. Required off-the-job instruction <i>in</i> the company	Is the share of off-the-job instruction time <i>in</i> the company (i.e. the time the student/apprentice spends in the company, but not in productive work, e.g. on company-owned training facilities) legally specified?	No.	n/a
4. Mandatory representation of:	Are the following three groups involved in the decision-making process about the content of work-based training?		n/a
d) Employers		Yes. See II.5.	
e) Employees		Yes. See II.5.	
f) Vocational teachers		Yes. See II.5.	
5. Statuary powers	Is the aforementioned body (see above, III.2) competent to:		n/a
a) Trainee certification	- Hand out training certifications to students/apprentices?	The competent body (i.e. the chamber of crafts and trades or chamber of industry and commerce e.t.c.) shall establish boards of examiners to administer final examinations (§ 39 BBiG). The competent bodies issue rules to be observed in connection with the final examination, amongst others to the issuance of examination certificate (§ 47 BBiG).	
b) Validation of employer sponsorship	- validate employer sponsorship (i.e. verify if possible new	§ 27-33 BBiG specify Training Premises and Training Staff.	

	training companies meet the necessary standards)?		
IV. Financial attributes			
1. Public subsidies	Is there public funding for:		
a) Classroom instruction?		Yes, school based training is fully financed by the Federal States and the local authorities. The share of the Federal States consist of the internal school affairs (e.g. supervision of school, teacher salary) while the share of the local authorities consist of the external costs (e.g. construction, operation and renovation costs of school buildings, procurement of teaching and learning facilities) (CEDEFOP, 2007)	General: Aid for Further Training for Advancement Act (AFBG) provides the statutory basis for financial support of vocational career advancement training. Master Craftsmen examination / certificate: The chamber of crafts and trades bears the costs of the examination (§ 50 HwO).
b) Workplace training?		No, the host company fully finances the workplace training. However, the Federal Ministry of Education and Research (BMBF) subsidies Intercompany training (intercompany VET facilities) which supplements the workplace training (CEDEFOP, 2007).	
2. Cost redistribution among employers	Is there an instrument of mandatory levy-grant finance to redistribute the costs of on-the-job training among employers?	No not in general. In some sectors (e.g. construction industry), the companies collectively agreed on financing regulations for training expenditure (CEDEFOP, 2007).	n/a
3. Regulation of VET/ PET students' salaries	How are VET/ PET students' salaries/ salary scales determined?	Training employers shall pay trainees an appropriate allowance. It shall be	n/a

		<p>increased at least once a year. (§ 17 Abs. 1 BBiG)</p> <p>The amount of the allowance is regulated by collective agreement between the parties and is on average about one third of the starting pay of a trained skilled worker. (CEDEFOP, 2007)</p>	
V. Education of VET/ PET teachers			
1. Regulation of VET/ PET teachers' education	Is there regulation on the education of VET/ PET teachers?	<p>Yes. The Federal Ministries of Education are responsible for the education of VET/PET teachers. The legal standards include laws and regulations on teacher training, study directives on study programs for the teaching profession, training directives on teaching practice and examination directives for the first and second state examinations (CEDEFOP, 2007).</p>	<p>Trade and technical schools:</p> <p>In general, teacher at trade and technical schools must have proficiency in teaching in a vocational school or obtained a degree at a university or an equivalent institution (KMK, 2007).</p> <p>Master Craftsmen examination / certificate:</p> <p>n/a</p>
2. Existence of minimal requirements	Does regulation stipulate minimal requirements regarding the education of VET/ PET teachers?	<p>Since the Federal States are responsible for the vocational schools, the education of VET/PET teachers may vary from Land to Land. The following is valid for most of the Lands.</p> <p>Minimum requirements for teachers for classes in vocational schools:</p> <ul style="list-style-type: none"> - Course of study at a university or an equivalent institution, involving at least two subjects, a vocational 	

		<p>subject and a general subject. Additionally it includes educational science with study in pedagogy and psychology and periods of teaching practice.</p> <p>Minimum requirements for teachers teaching vocational practice:</p> <ul style="list-style-type: none"> - Passed the master craftsman's qualifying examination or to have a qualification from a trade/technical school and a number of years of vocational experience - Teaching practice in a school and training in pedagogic seminars (CEDEFOP, 2007) 	
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