

Mapping the landscape of online job vacancies

Background report: Germany

Study: Real-time labour market information on skills requirements: Setting up the EU system for online vacancy analysis

Contract: AO/DSL/VKVET-GRUSSO/Real-time_LMI_2/009/16

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Preface

Over the last decades, online job portals have become important features of the job market. The Internet offers a rich source of live and real-time labour market information for almost all of occupations. It can provide insight on job-specific skills required in particular occupations in different regions, combined with information on the characteristics of the job offered – i.e. much more than is available using conventional sources. However, consistent and comparative information on the use of the internet and online job market by job-seekers and employers in Europe is rather scarce.

To tap the potential of online labour market information, Cedefop started to investigate the possibility to develop a system for gathering and analysing data from online job portals in the EU to complement the centre's toolkit of skills intelligence instruments. While this is feasible, drawing meaningful conclusions from these data requires a good understanding of the features of national online job markets. Therefore, Cedefop has mapped the landscape of the online job market in all EU Member States. This publication presents one of the background country reports developed in the project - 'Real-time labour market information on skills requirements: Setting up the EU system for online vacancy analysis' (AO/DSL/VKVET-GRUSSO/Real-time LMI 2/009/16). Its findings will inform the cross country comparison published in the upcoming synthesis report.

The work was undertaken by a consortium of external contractors: CRISP (Milano/IT), Tabulaex (Milano/IT) and IWAK (Frankfurt/DE) and their network of country experts (see annex 1 for detailed list) and closely supervised by Cedefop. It presents authors' analysis of the landscape of the online job portal market in the country using a methodology developed for the purpose of the project.

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List of Abbreviations

AGG	General Equal Treatment Act (Allgemeines Gleichstellungsgesetz)
BA	Federal Employment Agency (Bundesagentur für Arbeit)
Cedefop	European Centre for the Development of Vocational Training
CRISP	Centro di ricerca interuniversitario per i servizi di pubblica utilità, University of Milano-Bicocca
ESS	European Statistical System
EURES	European Employment Services
FDZ	Research Data Centre (Forschungsdatenzentrum) of the Institute for Employment Research (Institut für Arbeitsmarkt- und Berufsforschung)
HR	Human Resources
ICEs	International Country Experts
ICT	Information and Communication Technology
IAB	Institute for Employment Research (Institut für Arbeitsmarkt- und Berufsforschung)
IWAK	Institute for Economics, Labour and Culture/Centre of Goethe University Frankfurt
NACE	Nomenclature statistique des activités économiques dans la Communauté européenne
OJVs	Online Job Vacancies
PASS	Panel Labour Market and Social Security (Panel Arbeitsmarkt und soziale Sicherung/Lebensqualität und soziale Sicherung)
PES	Public Employment Services
SGB	Social Security Code (Sozialgesetzbuch)
SME	Small and Middle-sized Companies
TzBfG	Temporary Employment Act (Teilzeit- und Befristungsgesetz)
VET	Vocational Education and Training
WP	Work Package
WZ	Economic sector (Wirtschaftszweig)

Introduction

With the project “Real-time Labour Market Information on Skill Requirements: Setting up the EU System for Online Vacancy Analysis”, Cedefop explores online job-vacancies (OJVs) as a new source of real-time Labour Market Information. By crawling the most important online job-portals of the 28 EU Member States, Cedefop will further develop its understanding of the changing skills demand in different sectors and occupations. A systematic overview of the online job-portal landscape in each of the 28 EU Member States will identify the most relevant online job-portals and provide context for the data scraped from them. With the Landscaping Activity, Cedefop seeks to acquire insights into the structure of online job-portal markets and the extent to which online job-portals are used in recruitment and job-search. Furthermore, it aims to better understand which factors cause variation in the formats and content of OJVs in different countries.

This Country Report was compiled between April and October 2017 and constitutes a first overview of the online job-portal landscape in Germany. It is based on desk research of available data sources in Germany (e.g. public data, academic research and publications of interest groups) and expert opinions. Chapter 1 describes the methodology used for compiling the report in terms of the relevant search paths and data sources. Chapter 2 gives an overview of the main drivers for the use of online job-portals in recruitment and job-search, while Chapter 3 concentrates on the characteristics of the online job-portal market and lists the most important players. Moreover, it seeks to understand to what extent OJVs published on the online job-portals provide adequate information on the developments in the German labour market in terms of the number of vacancies and representation of sectors/occupations. Furthermore, it elaborates on the legal and regulatory framework guiding the activities of the job-portal owners and employers, highlights the differences between the public versus private online job-portals and delineates their relationships with one another. Chapter 4 covers the use of online job-portals in recruitment and job-search. It focuses on the differences in the behaviour of employers and job-seekers across sectors, occupations, qualification levels and regions. Chapter 5 presents the most important online job-portals in Germany for web-crawling and describes a step by step process of the OJV drafting and posting on select private and public online job portals. Chapter 6 concludes the Country Report by describing the main features of OJVs in Germany in terms of format and content. In particular, it explores to what extent OJVs contain information pertaining to hard and soft skills required for the job, how these skills are characterised and what they reveal about the nature of the job.

1. Methodology

1.1. Search Paths

In the first step, the databases of the Federal Employment Agency (BA)¹, the Federal Statistical Office² and the Institute for Employment Research (IAB)³ were searched for statistical data and publications concerning the use of online job-vacancies in recruitment and job-search. In the second step, desk research was carried out on the subject of recruiting and human resource management with an aim to identify the relevance of online job-portals and OJVs in these fields. The following search terms and their combinations were used between 14 February and 16 October 2017:

Search term 1	Combined with search term 2
Jobbörse(n) Job-portal(s)	Personalrekrutierung (Personnel) recruiting
Stellenanzeige(n) Job-vacancy (vacancies)	Jobsuche Job-search
Jobsuche Job-search	Deutschland Germany
Personalrekrutierung (Personnel) recruiting	

They were entered into:

- Google;
- Google Scholar;
- The German National Library's database for theses (Master's and PhD);
- The library database of Goethe University Frankfurt.

In the last step, expert interviews were conducted to deepen our understanding of the online job-portal landscape and acquire insights into aspects that were not addressed by secondary data and information. Furthermore, expert interviews were used to validate the results of the research and analysis, e.g. the selection of online job-portals for web-crawling.

In the following we are presenting a short overview of the three sources of data and information on which this report is based.

1.2. Data Sources

1.2.1. Public Data/Academic Research

Generally, statistical data on the use of OJVs in recruitment and job-search in Germany are scarce. In this report, results of the German Job Vacancy Survey of the IAB⁴ were used, which is the most valuable source of information on employers' recruitment processes and decisions. Beside it "there are no such regular, representative and comprehensive surveys concerning the re-

¹ In German "Bundesagentur für Arbeit" (BA).

² In German "Statistisches Bundesamt".

³ Institut für Arbeitsmarkt- und Berufsforschung (IAB).

⁴ Wave 2014, Q4 was the most current one that is publicly available.

cruiting processes in Germany or elsewhere” (Kettner et al. 2011: 245). It is a quarterly establishment survey conducted by the Institute for Employment Research, which depicts the job vacancy market in Germany. The Job Vacancy Survey investigates the totality of vacancies on the job market, including those positions which were not reported to the PES. The survey also includes information regarding the most recent recruitment strategies used by companies. Furthermore, it offers information about lapsed vacancies and insights into the effects of current labour market policies. For this report, remote data access through JoSuA⁵ as provided by the Research Data Centre (FDZ)⁶ of the German Federal Employment Agency at the IAB was used.

The questions relevant to this report can be found in the section “The Last Case of a Hiring”⁷. The setting for the questions is described as follows: “Please consider specifically **the most recent hire of a new employee for a position subject to social insurance contributions** within the last 12 months. If multiple people were employed at the same time, please select the person whose name is first in the alphabet.” (bold writing in the original questionnaire). Question 48 addresses the use of different search paths: “**How** did you **look for** candidates for this vacancy?” (bold writing in the original questionnaire).

The respondents can select multiple answers among the following options:

- Own ads in newspapers or magazines;
- Vacancy on the own homepage;
- Vacancy in online job-portals (without the Internet services of the Federal Employment Agency);
- Contact to the Federal Employment Agency (without the Internet services of the Federal Employment Agency);
- Use of the Internet Services of the Federal Employment Agency;
- Social Media (Xing, Facebook, etc.);
- Choosing among unsolicited applications/list of applicants;
- Private labour market intermediaries;
- Internal ad;
- Via an employee/personal contacts;
- Choosing among apprentices, temporary workers/agency workers, internal trainees;
- Other search paths.

In the responses, it is possible to differentiate across following dimensions relevant to our research questions:

- **Region:** East Germany/West Germany; single Federal States;
- **Company size:** <10 employees, 10-19 employees, 20-29 employees, 50-240 employees, 250-400 employees, ≥500 employees;
- **Sectors:** see Figure 5 for the sectors.
- **Qualification level required for the vacancy:** unskilled, vocational education and training, master craftsman⁸, Bachelor, Diploma⁹/Master.

⁵ http://fdz.iab.de/en/FDZ_Data_Access/FDZ_Remote_Data_Access.aspx.

⁶ In German “Forschungsdatenzentrum (FZD) des Instituts für Arbeitsmarkt- und Berufsforschung (IAB)”. More information on the survey and data access is available at: http://fdz.iab.de/en/FDZ_Establishment_Data/IAB_Job_Vacancy_Survey.aspx.

⁷ The complete questionnaire can be found at: http://doku.iab.de/fragebogen/IABSE_Papier-Fragebogen_IV_2016.pdf.

⁸ In German “Meister”.

⁹ In German “Diplom” (academic degree equivalent to both Bachelor’s and Master’s degrees).

The results of our analysis of the German Job Vacancy Survey are presented in Section 4.1.

Furthermore, in the German Job Vacancy Survey information is available on:

- Which one of the search path listed above led to fulfilling the vacancy;
- How long it took to fill the vacancy;
- Reasons for difficulties experienced in filling the vacancy (lacking professional qualifications of the applicants, exaggerated requests for wages/salary, lacking readiness of the applicants to fulfil the job requirements, too few applicants, other difficulties).

While these dimensions have been used for evaluating the effects of labour market reforms (e.g. changes in the regulations concerning unemployment benefits, see Section 2.1.), they are less useful for assessing the outreach of OJVs and the behaviour of job-seekers. Here, the results of the EUROSTAT ICT Survey of Households and Individuals¹⁰ constituted the main source of data, supplemented with results from surveys commissioned by large job-portals (e.g. Monster) or labour market intermediaries (e.g. Manpower).

The majority of academic publications had been either published more than ten years ago and were thus outdated or focussed on phenomena that are of marginal interest for this report, such as the use of social media in recruitment. These publications were not sighted for this report.

1.2.2. Research/Surveys of Interest Groups

In Germany, there is a wealth of studies concerned with the subject of recruitment issued by interest groups – both in large and small companies. The interest is most probably triggered by the omnipresent issue of shortages of skilled labour in political discourses and the media. Publications focussing on the use of online job-portals in recruitment present surveys commissioned by large online job-portals themselves (e.g. the University of Bamberg regularly carries out research on online recruitment trends for Monster.de) or present insights prepared by analytics companies such as Textkernel. In the case of the former category, the surveys often concentrate on large companies already extensively using online job-portals in recruitment, in the case of the latter there is hardly any information on the methodology and the sample. Therefore, we need to be aware of the bias inherent to these studies arising from the intention to present certain recruitment paths as particularly relevant and popular.

Moreover, there are studies which are generally concerned with the effects of digitalisation on different areas of activity in companies (e.g. in the sales/legal/personnel departments). Even though these studies are not explicitly concerned with the use of online job-portals and OJVs in recruitment, they can be used as a point of reference for assessing which progress the personnel departments have made in digitalising their activities and how this is likely to affect the propensity of companies to use online job-portals in the recruitment process. This topic is particularly virulent in small- and middle-sized companies (SMEs) and the initiators of such studies range from research institutes to banks and consultancies. Most of these studies confirm the trend that the personnel department is among the last ones to be digitalised. However, as the studies were following different research questions and varied greatly in their methodology and sample, we decided to cite only selected ones to avoid exploring in great detail the issues of comparability. The studies issued by online job-portals and labour market intermediaries provided useful for supplementing the data from the German Job Vacancy Survey and covering aspects for which no public data sources existed, e.g. for the use of online job-portals by job-seekers.

¹⁰ http://ec.europa.eu/eurostat/cache/metadata/de/isoc_i_esms.htm.

In Germany, little academic research has been carried out concerning the content of OJVs. Most notably, it exists in the fields of gender-sensitivity of OJVs and the effects of certain formulations of the application behaviour of job-seekers. However, several recruitment handbooks approach the drafting of OJVs (concerning both the format and content) in an analytical manner, thus proving a useful source containing interesting examples.

1.2.3. Expert Opinions

Explorative research indicated that the German labour market is highly heterogeneous and that employer behaviour regarding OJVs differs depending on the sector and company size. To capture this heterogeneity, we held in total eleven interviews with the Federal Employment Agency, the Federal Statistical Office, representatives from sectoral associations and private companies, a staffing agency, an online job-portal and consultancies (see the References for an overview of the interview partners).

We conducted two interviews with the Federal Employment Agency. One interview partner represented the department of employer services providing advice to employers when drafting OJVs. The second interview partner was an expert from the IT department, who handles technical questions related to posting OJVs to the national PES portal. We also interviewed an expert from the Federal Statistical Office who is involved in the ESSnet Big Data Project of the European Statistical System (ESS)¹¹, gaining a comprehensive overview of the topic and validating our selection of job portals.

To capture the employer perspective, we interviewed experts who could provide insights into the five largest sectors in terms of employed persons: mechanical engineering, trade, construction, health services and the public sector (see Table 3). We prioritised speaking with trade association representatives who work in the field of human resources, vocational training, and/or the labour market, as we expected them to have a broad overview of their sector. However, if the sectoral association representative could not be reached or they were unable to provide complete answers to our questions, we conducted supplementary interviews with representatives of companies from these sectors (mechanical engineering and construction).

As the relevance of online job-portals has increased as a result of the labour market reforms in the early 2000s (see Section 2.1.), we spoke to an expert in the recruitment process outsourcing department of a large temporary work and staffing agency. Two additional experts came from the Institute for Competitive Recruiting, a recruitment consulting company, and Crosswater Systems, a portal that provides information on eRecruiting, salary information, application processes, press reviews and analysis along with links to 1,500 online job-portals. Furthermore, our attempts to contact representatives from the major online job-portals were only successful in the case of a smaller portal which contains approximately 100,000 OJVs.

The expert opinions delivered very valuable information for assessing the relevance of OJVs particularly in recruiting processes. As a result, we acquired first insights into the most important sectors and have confirmed that in Germany the sector, company size, required qualification level for the vacancy as well as the location (urban/rural) influence the employer behaviour when deciding whether to post an OJV, which online job-portals to use and how to draft it.

In Table 1, only the sources related directly to the use of online job-portals and OJVs and containing information on the following dimensions are listed:

¹¹ The ESSnet Big Data project seeks to integrate Big Data in the regular production of official statistics. Germany is part of the ESSnet Work Package 1 concerned with the web-scraping of OJVs (see first overview of the results in Swier et al. 2017: 20ff.).

- Share of existing vacancies on online job-portals (PES/private);
- Use of OJVs per sector/occupation/qualification level/region;
- Skills requirements in OJVs.

Table 1: Overview of the different sources used in the Landscaping Activity

Type of source	Title/year	Provider	Information on			Quality
			Share of exist- ing vacancies on online job- portals (PES/private)	Use of OJVs per sec- tor/occupation/qualification level/region	Skills requirements in OJVs	
Source 1: Public data/ academic re- search	German Job Vacancy Survey	Institut für Arbeits- markt- und Berufs- forschung (IAB) [Institute for Employment Re- search]		Yes		High
	Nielsen, Martin/Luttermann, Karin/Tödter-Lévy, Magdalène (Eds.): Stellenanzeigen als In- strument des Employer Brand- ing in Europa: Interdisziplinäre und kontrastive Perspektiven [Job Vacancies as an Instru- ment of Employer Branding in Europe: Interdisciplinary and Contrasting Perspectives]	Wiesbaden: Springer			Yes	High
	Swier, Nigel/Hajnovic, Fran- tisek/Jansson, Ingegerd/Wu, Dan/Nikic, Boro/Pierrakou, Christi-na/Rengers, Martina (2017): Work Package 1: Web scraping/Job vacancies, Deliv- erable 1.3, Final Technical Re- port (SGA-1), Version 2017-07- 08	ESSnet	Yes			High

Source 2: Research/ surveys of in- terest groups	Der virtuelle Arbeitsmarkt in Deutschland (Q2 2016) [The Virtual Labour Market in Germany (Q2 2016)]	Textkernel		Yes		Intransparent
Source 3: Expert opinions	Expert opinions 2017	Experts 1-11 (see the References for detailed information)	Yes (not all experts)	Yes	Yes	Limited due to sectoral focus of some experts/fragmented situation in the landscape of online job-portals

Source: IWAK.

2. Labour Market Dynamics and Impact on the OJV Market

Currently, Germany is experiencing record-breaking employment activity and demand for skilled labour. With a working population that exceeded 43.6 million in 2016 including 31.5 million persons in jobs subject to social security contributions (Fuchs et al. 2017: 1, 5), Germany has the largest workforce in the EU. In the first quarter of 2017, Germany also had the second lowest unemployment rate in the EU at 4% (OECD Labour Market Statistics: Q1 2017). These numbers reflect ongoing transformations within the labour market brought on by internal political, social and economic developments as well as by global trends. Changes caused by political reform, technological development and demographic shifts are expanding some sectors and occupations, generating greater skills needs as well as shortages. At the same time, demand in other fields is decreasing due to automation. As a result, both employers and job-seekers are turning to online job-portals for a faster and more effective matching. In the following, the main drivers enhancing the use of OJVs in recruiting and job-search are presented.

2.1. Political Labour Market Reforms

In the decade following reunification, Germany experienced unprecedented high levels of unemployment, prompting the establishment of the so-called Hartz Reforms in the early 2000s. The reforms, which were the largest in German post-war history (Klinger and Rothe 2012: 111) aimed “to modernise labour market institutions and, thus, reduce inflows into unemployment and ease the transition out of unemployment.” (Klinger and Rothe 2012: 90). Policy changes implemented between 2003 and 2005 included the re-organisation of the Federal Employment Agency (see Section 3.1.), re-configuration of unemployment benefits towards less or shorter entitlements, and deregulation of the labour market (Klinger and Rothe 2012: 93, Kettner and Rebien 2007: 1). At the same time, the Hartz Reforms saw the introduction of large state-lead programmes to qualify and orient long-term unemployed people and thereby grow the active workforce. While the ultimate impact and value of the reforms is widely debated, Germany’s unemployment rate has dropped considerably since their adoption. In addition, Germany stood out among EU countries for its ability to ride out the global financial crisis relatively unscathed, experiencing only a brief dip in its employment rate in 2008.

The latest in the series of Hartz Reforms were concerned with consolidating the earnings-related, but means-tested unemployment and social assistance into “a general minimum income support scheme with strong activation requirements” (Eichhorst and Marx 2009: 21), known as Hartz IV. One of its constitutive elements was the increased pressure on job-seekers to take on lower-skilled and paid jobs. One outcome associated with the Hartz IV reforms is a growing chasm between the experiences of high- versus low-skilled workers. While skilled labour is associated with stability, security and increased academisation, unskilled labour is associated with precarious employment and the proliferation of the so-called “Minijob”, denoting part-time, low wage marginal employment paying less than €450 per month.¹² Whereas the most highly skilled workers, with tertiary level education, had an unemployment rate of 2.2% in 2016, workers who had not completed secondary

¹² While full-time and some part-time employees are subject to social insurance contributions including unemployment, health, pension and long-term care insurance, “Minijobbers” are exempt of these payments.

education had an unemployment rate of 10% during the same time period (OECD Education at a Glance: 2016).

The differentiated experiences between labour categories and qualification levels also play a role in the recruitment process and the use of online job-portals. Employers are more likely to use the Internet and private job-vacancy portals for advertising jobs requiring a high level of formal qualifications as well as skills, as these venues allow for a wider outreach to qualified candidates. Due to the scarcity of skilled labour, those search efforts must focus mainly on currently employed populations. Therefore, OJVs need to be designed in a way that would make switching employers attractive for individuals. In addition, more specialised searches are required to reach this target group and the online job-portals allow the employers to implement more focused, skills-based search techniques (Brenzel et al. 2015: 3).

On the contrary, lower-skilled or unskilled jobs are more likely to be advertised by word of mouth or through the Federal Employment Agency's online job-portal (Brenzel et al. 2015: 3), which was re-configured in the course of the Hartz Reforms to better meet the needs of the low-skilled population and their employers.

2.2. Digitalisation

Digitalisation contributes to a quickly changing and more highly differentiated labour market affecting it through:

- **Digital divides appearing across sectors as well as groups of employers and job-seekers:** a new point of distinction is created between employers and sectors that are highly digitalised and those that are not. It also distinguishes between the competences and skills of digitally literate job-seekers versus digitally illiterate job-seekers.
- **New skills requirements:** skills profiles of occupations change due to the introduction of new technologies and new definition of tasks. In addition, the overall quality and quantity of available work is increasingly defined by an occupation's reliance on technology and its expectation about workers' abilities to use technology and contribute to digitalisation efforts.

The extent to which a company or job-seeker is digitally competent affects how that entity or individual interacts with online job-portals. First, increasing digitalisation within a company includes the increased digitalisation of HR and recruiting efforts. To that end, more digitally advanced employers may be more aware of the opportunities entailed in the use of online job-portals offer in terms of reaching out to a larger group of potential candidates and improving the matching efforts. Furthermore, they are probably more comfortable publishing job vacancies on online job-portals. Also individuals are becoming accustomed to browsing information regardless of place and time (E6), indicating that more digitally literate job-seekers, including currently employed individuals, may be most likely to use online job-portals to browse job opportunities. Moreover, the extent to which an employer uses online job-portals and expresses interest in digitalisation within OJVs can affect the likelihood of finding and attracting equivalently technologically capable and interested candidates.

We would expect that sectors that have more readily embraced digitalisation in the workplace will also more actively post to online job-portals. While the ICT, finance and insurance as well as retail sectors in Germany have made great progress in the field of digitalisation, the hospitality as well as health and elderly care sectors are still lagging behind in their development (Bundesministerium für Wirtschaft und Energie 2017: 14).

Similarly, company size can affect the ability to adopt technological advances. SMEs in particular often struggle to find the financial resources and qualified personnel to incorporate digital solutions into their activities (e.g. production, sales and distribution, personnel) (Brenzel et al. 2015). Research shows that only one fifth of SMEs have a comprehensive strategy for digitalisation. In a study of digitalisation challenges for SMEs in different sectors (Deloitte 2013), the respondents claimed that their accounting system was very well or well prepared for digitalisation in 78%, finances in 76%, ICT in 74% and controlling in 74% of cases. In contrast, only 36% of the respondents considered their HR department to be very well or well prepared to benefit from digitalisation or face the challenges arising from it (Deloitte 2013: 21). The greatest barriers for SMEs to digitise are insufficient ICT-knowledge (67% of surveyed companies), concerns about data protection and data security (62%), prohibitively high costs (59%) and low Internet speed (58%) (Saam et al. 2016: 13). The inability to adopt technological solutions could negatively affect SMEs' ability to compete in the marketplace as well as in their recruitment efforts. Not only might they not seem as appealing for digitally literate job-seekers, they may also be less likely to advertise vacancies online.

Digitalisation also affects both the availability of employment in Germany as well as the skills and competences required to work in many fields. According to a study, automation could endanger up to 12% of the jobs in Germany (Bonin et al. 2015: 14). The disappearance of certain jobs, particularly routine tasks that can be replaced by automation, could further contribute to the need and proliferation of labour re-activation projects and the resulting expansion of the low-wage sector discussed in Section 2.1. While some occupations will experience a decrease in the complexity and competences required to do work due to replacement through automation and assistance from computer-supported systems, other occupations will increase in complexity (Wolter et al. 2016). Already, ICT competencies are under increasing demand and ICT skills will become required in jobs where they were not obligatory in the past. Digital skills will therefore appear more frequently in OJVs regardless of sector.

2.3. Changes in the Economic Structure

Tracking the rise and fall of key sectors in the German economy helps to indicate where OJVs and online job-portals will focus in coming years. Although the German economy shows a gradual move from the production sector to the provision of services, this transformation is less pronounced than in Ireland, the UK, Finland, Luxembourg and Portugal (Institut der Deutschen Wirtschaft Köln 2016: 34f.). This is partly due to strong ties between the production and services sector in Germany, where industry continues to be the engine behind the creation of added value in other economic sectors (ibid.: 30f.), and the economy remains export-oriented. Table 2 illustrates the re-structuring showing slight decreases in the share of the economy devoted to agriculture and forestry/fisheries as well as production and modest increases in the services sectors.

Table 2: Economic structure in Germany: comparison of 1995 and 2014 (nominal gross value-added of economic sectors in billion €; share of total gross value added in %)

		1995		2014	
		Billion €	Share in %	Billion €	Share in %
Agriculture and forestry, fisheries		18	1.1	20	0.8
Production		563	32.7	801	30.7
	Production	388	22.6	581	22.3
	Mining/energy	57	3.3	96	3.7
	Construction	118	6.8	124	4.8
Services		1,139	66.2	1,790	68.6
	Trade/traffic/catering and hotel industry	274	15.9	404	15.5
	Information and Communication	65	3.8	122	4.7
	Financial and insurance services	81	4.7	105	4.0
	Real estate activities	188	10.9	290	11.1
	Trust and company services	166	9.6	284	10.9
	Public services/education/health	294	17.1	477	18.3
	Other services	71	4.1	108	4.1
Total economy		1,720	100	2,611	100.0

Source: Institut der Deutschen Wirtschaft Köln (2015: 26) (data of the Federal Statistical Office and their own calculations).

Table 3 confirms the continued importance of the production sector in Germany, as two of the five largest sectors, manufacturing and construction, represent over a quarter of the German labour market. The five sectors with the largest share of employment (totalling 60% of all employed) in Germany in 2015 are: manufacturing, wholesale and retail trade, human health and social work activities, public administration and defence, construction.

Table 3: Top 5 sectors with the largest share in employment in 2015 in Germany (in %)¹³

No.	NACE Rev. 2				Share	
1	C (10-33)	Manufacturing				19.30 %
Employment subject to social security contributions by the employee				Part-time employment not subject to social security contributions by the employee (“Minijob”)		
WZ	NACE REV. 2	Number of persons	WZ	NACE REV. 2	Number of persons	
28	Manufacture of machinery and equipment n.e.c.	1.030.044	10	Manufacture of food products (especially 10.7 Manufacture of bakery and farinaceous products)	142.437	
29	Manufacture of motor vehicles, trailers and semi-trailers	905.664	25	Manufacture of fabricated metal products, except machinery and equipment	102.854	
25	Manufacture of fabricated metal products, except machinery and equipment	795.163	28	Manufacture of machinery and equipment n.e.c.	44.005	
			29	Manufacture of motor vehicles, trailers and semi-trailers	8.228	
2	G (45-47)	Wholesale & retail trade				14.10 %
WZ	NACE REV. 2	Number of persons	WZ	NACE REV. 2	Number of persons	
47	Retail trade, except of motor vehicles and motorcycles	2.351.156	47	Retail trade, except of motor vehicles and motorcycles	918.810	
46	Wholesale trade, except of motor vehicles and motorcycles	1.346.848	46	Wholesale trade, except of motor vehicles and motorcycles	245.406	
3	Q (86-88)	Human health & social work activities				12.70 %
WZ	NACE REV. 2	Number of persons	WZ	NACE REV. 2	Number of persons	
86	Human health activities	2.350.181	86	Human health activities	432.831	
861	especially Hospital activities	1.372.805	862	especially Medical and dental practice activities	236.793	
88	Social work activities without accommodation	1.183.477	88	Social work activities without accommodation	200.826	
4	O (84)	Public administration & defence				6.86 %
WZ	NACE REV. 2	Number of persons	WZ	NACE REV. 2	Number of persons	
8.41	Administration of the State and the economic and social policy of the community	1.228.185	84.1	Administration of the State and the economic and social policy of the community	113.664	
5	F (41-43)	Construction				6.77 %
WZ	NACE REV. 2	Number of persons	WZ	NACE REV. 2	Number of persons	

¹³ The sectors with the largest number of employed persons identified in the EU Skills Panorama were further specified based on the employment statistics of the Federal Employment Agency (Bundesagentur für Arbeit 2016). The differentiated view gives us more precise insights into the employment structure in a particular sector concerning the types of employment relationships (jobs subject to social security contributions by the employee vs. "Minijobs").

43	Specialised construction activities	1.224.092	43	Specialised construction activities	250.757
432	especially Electrical, plumbing and other construction installation activities	597.783	432	especially Electrical, plumbing and other construction installation activities	111.417

Source: IWAK (including EU Skills Panorama (downloaded on 20 January 2017) and data of the Federal Employment Agency (Bundesagentur für Arbeit 2016).

Table 4 presents the sectors with the strongest forecasted growth in employment numbers. High growth sectors may indicate areas of particular importance in the OJV market and therefore for our future scraping activities. As Table 4 does not indicate the current number of jobs represented by the high growth sectors, it must be examined in parallel with Table 3 to determine whether high growth sectors overlap with any of the currently dominant sectors.

Table 4: Sectors expected to have the strongest employment change over the period 2015-2025 in Germany (in %) ¹⁴

No.	NACE Rev. 2		Change (%)
1	L+M	Real estate, professional, scientific and technical activities	15.38 %
WZ	711	Architectural and engineering activities and related technical consultancy	
2	K	Financial and insurance activities	14.96 %
WZ	64 65 66	Financial service activities, except insurance and pension funding, Activities auxiliary to financial services and insurance activities	
3	P	Education	9.65 %
WZ	852 853	Primary education Secondary education	
4	J	Information & communication activities	6.82 %
WZ	620	Computer programming, consultancy and related activities	
5	N	Administrative and support service activities	1.55 %
WZ	782	Temporary employment agency activities	

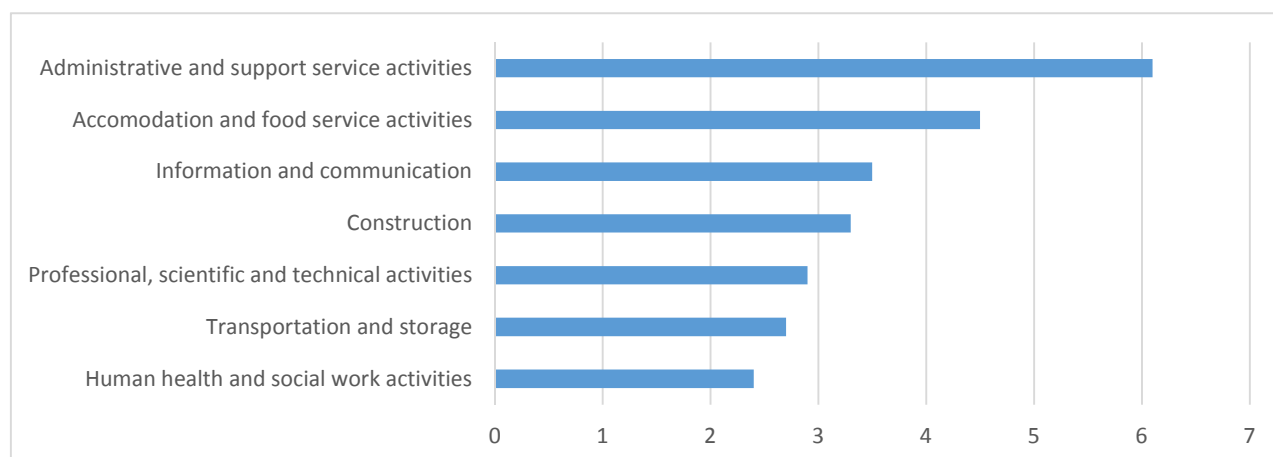
Source: IWAK (including the EU Skills Panorama (downloaded on 20 January 2017) and data of the Federal Employment Agency (Bundesagentur für Arbeit 2016, Bundesagentur für Arbeit 2017).

Comparing Table 3 to Table 4 demonstrates that high potential growth sectors do not necessarily align with the sectors that currently have the largest employment shares. We would anticipate a growth in the number of OJVs geared towards high growth sectors, reflecting the anticipated increase in vacancies. However, a high level of growth does not indicate that these sectors are poised to overtake the five largest sectors regarding the number of people employed. Nevertheless, understanding which sectors are experiencing growth help us direct our focus towards the appropriate recruitment channels. Fields such as financial services, engineering and computer programming do tend to be fields that actively recruit through private online job-portals.

¹⁴ The sectors displaying the largest increase in employed persons as identified in the EU Skills Panorama were further specified based on the employment statistics of the Federal Employment Agency (Bundesagentur für Arbeit 2016, Bundesagentur für Arbeit 2017). Data for December 2015 were compared with data from June 2016 to specify further the sectors and check whether they supported the forecast developments in the EU Skills Panorama.

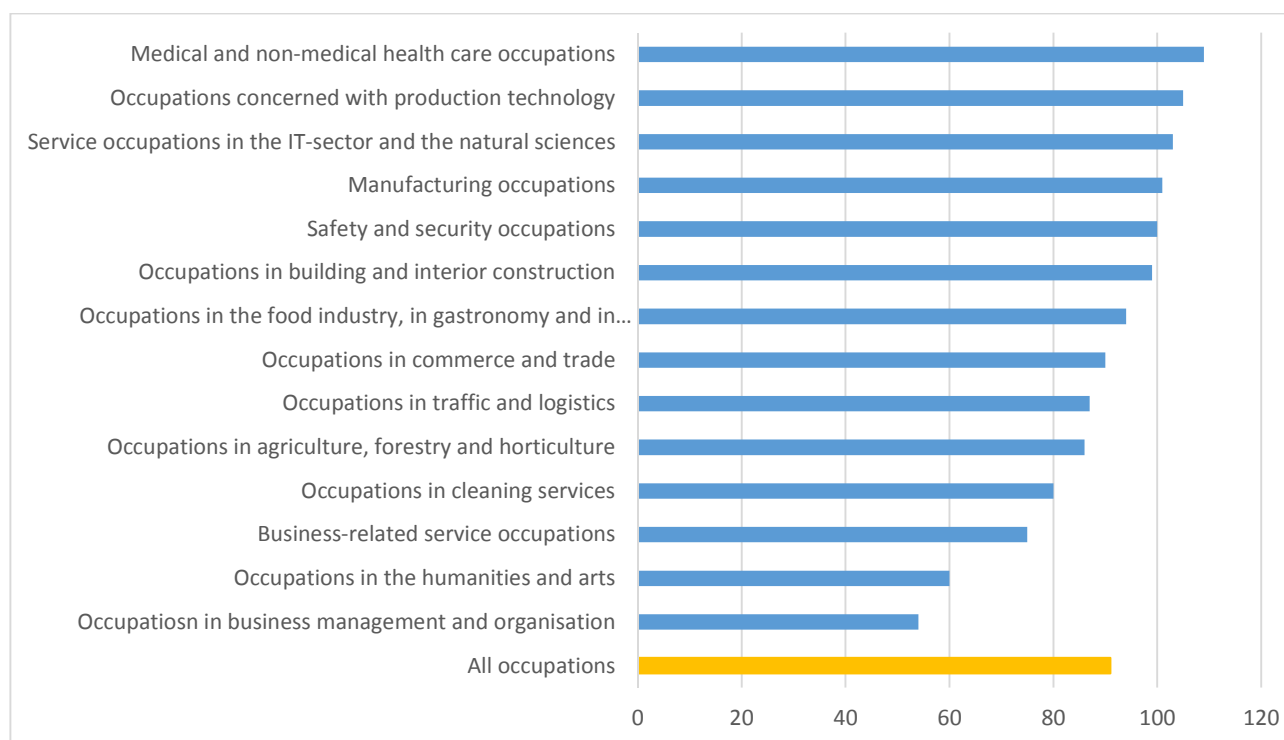
Furthermore, Figure 1 shows that fields such as IT and Engineering are not only poised for growth, but are also demonstrating high vacancy rates, meaning that many vacancies are published in these sectors. We can attribute some of the growth in these sectors to the greater focus on technology and digitalisation described in Section 2.2., as well as the continued emphasis on production. Healthcare fields, represented in Table 3 as one of the largest sectors in 2015, also indicates high vacancy rates in Figure 1 (see Section 2.4. regarding the relationship between the demographic shift and the healthcare sector).

Figure 1: Job Vacancy Rate for different economic activities in Germany (above average), 2015



Source: CRISP (2016).

Looking at Figure 2 indicates that the vacancy time, i.e. the length of time a vacancy remains unfilled, is similarly high for many of these same occupations in the ICT, Healthcare and Technical fields in which there is a high vacancy rate. The existence of high vacancy rates coupled with high vacancy times in sectors that are large and growing shows a propensity towards labour shortages.

Figure 2: Vacancy times in jobs subject to social security contributions by occupational segments (days)

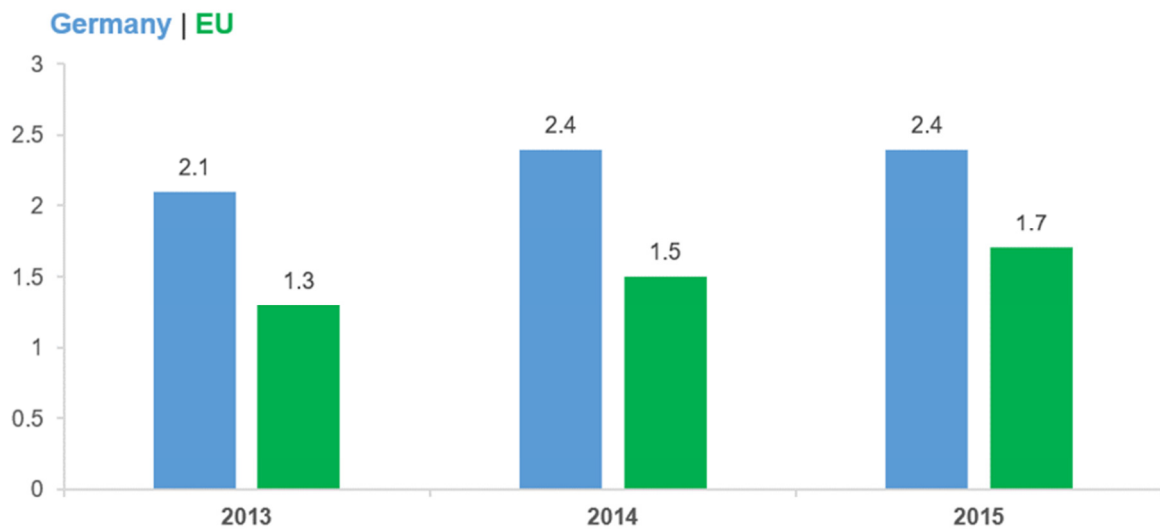
Source: Federal Employment Agency (May 2016).¹⁵

A shortage of applicants leads to a high degree of openness and flexibility by employers regarding recruitment methods and expectations of applicants, often indicated in OJVs through more language directed at promoting the benefits of working at a particular company and less emphasis on required competences (see Section 6.3.). Jobs with a nationwide shortage in Germany are listed by the Federal Employment Agency¹⁶.

In part owing to its strong, growing labour market and relatively low unemployment rate, but also in response to a skills mismatch and a lack of qualified replacements for a retiring workforce (see Section 2.4.), Germany has a vacancy rate that is consistently higher than the EU average (see Figure 3).

¹⁵ The translation of occupational segments followed the Klassifikation der Berufe 2010/German Classification of Occupations 2010.

¹⁶ List of occupations with skills shortages: www.arbeitsagentur.de/positivliste.

Figure 3: Job Vacancy Rates for Germany and the EU, 2013-2015 (% variation)

Source: CRISP (2016).

2.4. Demographic Change and Regional Differences

Despite an overall strong labour market, closer examination of Germany's regional differences and demographic shift reveal additional challenges to maintaining a strong labour market. Disparities persist between the New Federal States (former East Germany) compared to the West. Population decline in the East intensified during German reunification due to regional out-migration and a decreased birth rate (Wiechmann and Pallagst 2012). Because of the lower employment opportunities, the East is still less likely than the West to see permanent resettlement of immigrants and refugees, one of the ways in which the West is able to compensate for a low birth rate.

Furthermore, forecasts have shown that the population across the country is rapidly ageing (Veen 2009: 15). While recent years have indicated a modest upturn in the birth rate, particularly in the East, as well as an unprecedented increase in immigration and refugee settlement, these factors are not currently outpacing the rate at which the population is aging. The aging population affects the OJV market twofold:

- As there are less young people entering the labour market, it is more difficult for companies to meet their replacement demand;
- Longer lifespans increase the demand for elder care workers, resulting in extension demand.

These developments are most visible in the growing employment numbers and increased vacancy times in the health and elderly care sector documented in Section 2.3.

While vacancy times as shown in Figure 3 are high across the country, replacement efforts are particularly aggravated in the East, where the post-reunification out-migration and the impact of the birth rate decrease during the 90s results in longer and more difficult searches to find qualified replacements (Brenzel et al. 2015: 5). One outcome of replacement challenges is that companies have to design their OJVs in a more attractive way to appeal to potential candidates (E6). Another

outcome is the passing of the Recognition Act¹⁷ in 2012, which more broadly recognises foreign professional degrees within Germany. The Recognition Act allows workers to immigrate to Germany if they have degrees needed for sectors experiencing high growth levels and/or having to replace retiring workers. It also means that German companies have greater incentive to publish vacancies to portals that have a more global reach, such as the EURES Portal.

However, changes in the labour market affecting the use of online job-portals do not always result from long-term developments, but can also arise from external influences. For example, the overall increase in the immigrant population in Germany also directly affects the OJV market, as teachers and social workers are in higher demand to help settle new arrivals and prepare them to enter the German labour market. In 2014 and 2015, about 325,000 refugees (2% of the overall student body in Germany) were integrated into the German school system (Greiner 2016). More than 12,000 teachers have already been recruited to meet the new demands, but continuing demand is anticipated.

¹⁷ Gesetz zur Verbesserung der Feststellung und Anerkennung im Ausland erworbener Berufsqualifikationen (Anerkennungsgesetz) [Act for the Amelioration of the Assessment and Recognition of Vocational Qualifications Acquired Abroad].

3.Context and Characteristics of the Online Job-portal Market

3.1. PES Online Job-portal

3.1.1. Legal/Regulatory Framework

As a public service provider, the Federal Employment Agency checks that all OJVs adhere to a set of criteria including legal guidelines, specific data protection laws and general political correctness (E6). Since guidance and placement services as well as benefits provided by the Federal Employment Agency are regulated by the Social Security Code (SGB)¹⁸, it also regulates the collection and use of personal data needed for providing these services.

3.1.2. Organisational Structure of the PES Online Job-portal

Headquartered in Nürnberg, the Federal Employment Agency has ten regional directorates, 156 local level agencies and around 600 branch offices. The headquarters are responsible for strategic decisions and management of the regional directorates. The regional directorates are responsible for operational implementation and management of the Employment Agencies (responsible for short-term unemployed receiving unemployment benefits, SGB II) and Job Centers (responsible for long-term unemployed receiving social benefits, SGB III), which are the direct contact points for job-seekers. Apart from offering occupational guidance to job-seekers, the Employment Agencies provide employer support services, meaning that companies are paired with a permanent contact person at the Employment Agency who advises them on specifying the requirement profiles and supports them by pre-selecting potential candidates to fill the vacancy.

The online job-portal of the Federal Employment Agency, Jobbörse¹⁹ was launched in 2003 and is managed at the headquarters in Nürnberg. The Jobbörse includes a front end, which users can browse as well the back end for internal use.

3.1.3. Focus of the PES Online Job-portal

When the Jobbörse was launched in 2003, commercial online job-portals as well as representatives of printed media were concerned that it would be serious competition to them. However, over a decade later, public and private portals co-exist well and complement one another (Eva Zils on online-recruiting.net²⁰). One reason for this is that the Federal Employment Agency functions as the contact for smaller companies, which profit from personal advice and have smaller budgets for recruitment (E9).

The Federal Employment Agency publishes OJVs across all sectors, occupations, and qualification levels. However, the SGB III laws have designated it as the agency responsible for unemployment benefits and labour re-activation projects. When an individual becomes unemployed, they register with the Federal Employment Agency, share their CV for matching purposes and obtain access to the Jobbörse. As a result, the PES has become particularly associated with low-skilled and/or blue-collar workers and Hartz IV recipients in addition to general job-seekers. The PES portal also pub-

¹⁸ In German „Sozialgesetzbuch“ (SGB).

¹⁹ <https://jobbörse.arbeitsagentur.de>.

²⁰ <http://www.online-recruiting.net/online-jobboersen-in-deutschland/>.

lishes OJVs for apprenticeship training positions (E6). Unlike private portals, the PES works on a cost neutral basis, meaning that both publishing OJVs on the Jobbörse as well as searching the portal are free of charge. Furthermore, no commercial advertisements are listed on the website.

3.1.4. Outreach of the PES Online Job-portal

As of November 2017, over 1.4 million vacancies are listed on the Jobbörse not including apprenticeship positions. Occasionally, vacancies are submitted to the Federal Employment Agency, but not published to the Jobbörse. This occurs when the Federal Employment Agency conducts a pre-selection of candidates for the client company using an internal the matching tool. The pre-selection is then limited to matches within the existing databank of CVs and job-seekers known to the PES staff to avoid an overwhelming wave of applicants. According to the assessment of the experts, only around 4-5% of all vacancies are published internally; the rest are published online. In addition to vacancies published to the PES by the employer, additional OJVs are published on the Jobbörse from private portals that collaborate with the Federal Employment Agency. Swier et al. (2017: 30) explain that the Federal Employment Agency “has commissioned the development of a job robot that web scrapes the web sites of employers and serves as an additional input for the FEA’s [Federal Employment Agency’s] placement services. The job robot currently includes 780,000 job advertisements. Both the job portal and the job robot are including duplicates and are currently only used statistically (together with the statistics on registered vacancies) for the calculation of a job vacancy index (BA-X)”.

Furthermore, the interviewed representative of the Federal Employment Agency pointed out that multiple job openings are sometimes represented by one OJV. This occurs when an employer has several openings with the same title and job description (E6). Therefore, it is not always clear how the number of OJVs translates to the number of available jobs and the number of people ultimately employed through a given OJV.

3.1.5. Posting of PES Vacancies on EURES

All vacancies listed on the Jobbörse that are subject to social insurance contributions are automatically posted to EURES, while apprenticeships are not transmitted. The vacancy transfer is an automatic process that occurs via an XML interface and entails a slight delay as they are included in the night after their publication on the Jobbörse (E7). When publishing their OJVs on the Jobbörse, the employers are required to actively opt for transmitting their OJV to EURES. According to experts interviewed for the EURES Report²¹, most of the companies do not object to that even if they are not familiar with the platform. However, there might be regional differences with the employers in border regions (e.g. at the border to the Netherlands) are more prone to publishing their job vacancies on EURES. The same is true for certain sectors and occupations experiencing shortages of skilled labour (see Section 2.3.), such as health and elderly care and engineering (E6).

Moreover, EURES does not capture all elements of the OJV available on the online portal of the Federal Employment Agency as some graphic features are excluded from the transfer. And, while the content generally does transfer to the EURES system, it is re-formatted. As a result, the clean, harmonised template format of the PES is lost. In its place, EURES ads from Germany tend to present information in jumbled paragraphs and run-on-sentences. Some data fields present in the German template do not exist in the EURES format or are labelled differently in EURES, resulting in duplication or absence of data from pre-formatted fields.

²¹ WP6 Report in the Landscaping Activity.

3.2. Private Online Job-portals

3.2.1. Legal/Regulatory Framework

There is no specific regulation concerning the operation of private job-portals. However, when drafting an OJV, companies have to consider various legal requirements and regulations, such as the General Equal Treatment Act (AGG)²² (see Chapter 6 for details concerning the format and content of OJVs). Furthermore, according to the Works Constitution Act²³, workers' councils can influence whether a position is published externally or is first advertised internally.

3.2.2. Dominant Online job-Portals and Their Business Models

The term "online job-portal" is an umbrella term, which describes all websites with OJVs from third parties (E5). Germany has approximately 1,600-2,000 job portals (Swier et al. 2017: 20, Eva Zils on online-recruiting.net). The Crosswater Job-portal Directory²⁴ monitoring the developments among online job portals in Germany registered 1,700 job portals as of 23 March 2016. The two sub-categories of online job-portals are primary online job-portals and aggregators. On primary online job-portals, companies post their job advertisements and pay a fee. There are generalist and specialised primary online job-portals. The generalists rely on their universal offers and their brand name, while specialist primary online job-portals focus on niche markets.

Aggregators obtain their vacancies from job search machines according to a bilateral contractual relationship. Job search machines search and collect job advertisements from company career pages and then process them, for example by classifying them. There are around 66 job search machines (like Kimeta or Indeed) in Germany. They are characterised by a particularly large number of available OJVs, but not as many site visitors.

Private job-portals have different business models, which are accompanied by various financing models. Mostly companies pay for publishing their job advertisements on online job-portals. In addition, job-portals can earn money by placing commercials on the website. Some online job-portals complement their offer with other services, for example they support companies in the content design of OJVs or offer to filter candidates and preselect potential candidates for the companies (E9). The job vacancies that are reported to the primary online job-portal for publishing find their way into the database through various channels. Manually entering the description text or uploading the OJV in XML format are the most common methods. All online job-portals offer various methods of publishing OJVs, which range from standard or basic to premium and come with different costs and services. The premium offers should result in a wider reach of the OJVs and be listed among the first results.

Currently, the OJV market is dominated by large publishing houses and international brands. The Axel Springer publisher has taken over Stepstone, Hotelcareer, Meinestadt.de and Immonet. The Funke Mediengruppe owns the portals Absolvanta, joblocal as well as additional regional job markets such as Azubiyo. Recruit Holding (Japan) is the parent company of Indeed.com. Medien Union GmbH, which is headquartered in Ludwigshafen and already owns the portal Jobware, has expressed interest in purchasing the career portal Experteer, an online job-portal based in Munich and focusing on salaries exceeding €60,000 per annum. As a result, there are arrangements for publishing the OJVs of online job-portals also in the online job-portals of daily papers or specialist journals.

²² Allgemeines Gleichbehandlungsgesetz (AGG).

²³ Betriebsverfassungsgesetz.

²⁴ <http://crosswater-job-guide.com/jobborsen-von-a-z/nach-zielgruppen-brancheberuf>.

We can observe another tendency towards collaborations and mergers between personnel services and online job-portals. For example, Randstad Holding NV, a Dutch HR service provider, is a major player in the online job-portal market. Randstad, which has long owned the German freelancer portal, GULP, purchased Monster.de in 2016 and more recently the European freelancer Marktplatz Twago, from which it obtained access to 500,000 freelancer profiles. (E8).

Next to Stepstone and Monster.de the experts identified Indeed as an important online job-portal in Germany. In the following, their business models are described in more detail.

Stepstone is a general online job-portal catering for a large number of industries and education/skill levels. It uses strategic partnerships to increase the range of its OJVs and according to Stepstone they are published on up to 450 partner websites. Stepstone offers additional services both for employers and job-seekers, e.g. job-seekers can upload their own CV and create a profile to capture the interest of potential employers. Additionally, the website presents some publications on salary and tips for the job application process. Furthermore, job-seekers can receive emails with information about new job offers related to their searches. Companies are supported by online product advisors when publishing OJVs. Moreover, it is possible to publish the OJV in the global Stepstone network involving over 138 countries. Stepstone offers webinars for companies to ask questions and learn about international recruitment and country-specific OJV design. Companies pay fixed prices for OJVs on Stepstone (E9). These are valid for 30 days, after which the OJV has to be renewed (E11). The prices are designed so that companies that publish more OJVs pay a lower rate.

Monster.de is also a general portal with a wide selection of OJVs. Monster.de works with more than 190 partner websites, including jobpilot.de, spiegel.de and t-online.de. Monster.de offers job-seekers the opportunity to upload their CV and create a candidate profile, just like Stepstone. The career advice section offers a career journal as well information regarding salary and applications. In addition, job-seekers can access company profiles. Like Stepstone, Monster.de offers online product advisors, who consult with employers when publishing OJVs and offers the option to publish OJVs internationally. Furthermore, emails can be sent to target candidates and display banners can be published in social media channels. Monster.de uses the software TalentBin, which collects job-related information from public datasets via Google and social media channels. Companies can then filter the data to find suitable candidates, who may not be actively job searching. Monster.de has a similar cost model to Stepstone wherein companies pay fixed prices and receive volume discounts.

Indeed is a job search engine, which displays OJVs from other job markets supplemented by OJVs that are published directly on Indeed. Job-seekers can upload their CVs and directly apply to suitable positions. Documents including cover letters can be uploaded to the portal and sent directly to potential employers. Employers can publish OJVs and create company profiles which employees and candidates can read and rate. On Indeed, companies do not pay for standard OJVs. Rather, employers pay per click for premium ads. This means companies only pay when job-seekers look at a premium OJV. The costs are capped to a certain limit set by the company.

Experteer is portal which offers job postings for executive positions paying at least €60,000, providing free basic access to job-seekers and employers/recruiters and a fee for service model for both job-seekers and recruiters interested in premium packages. The job-seeker service is called "Experteer for Candidates". Basic use includes the ability to create a profile, but access to all OJVs, the ability to see which recruiters have visited one's profile and the ability to reply directly to recruiters for a monthly subscription fee of €12.90 to €29.90. The employer and recruiter service is called "Experteer for Recruiters". Recruiter access to candidate search is different for search firms and companies. Recruiters and companies can choose from a variety of packages related to candidate search management, headhunting, employer branding and posting of OJVs.

Each year, job-boards are rated in a quality competition initiated and carried out by PROFILO, the rating portal jobboersencheck.de and the Institute for Competitive Recruiting²⁵ to honour online job-portals offering high quality services to employers and job-seekers alike. In 2017, following job-portals occupied the first three places in the seven different categories:

- **Generalist online job-portals (primary):** Stepstone, Jobware, Jobstairs (followed by XING and LinkedIn);
- **Generalist online job-portals (secondary):** Indeed, Gigajob, Kimeta;
- **Specialist online job-portals:** Jobvector, Azubiyo, Yourfirm;
- **Best job-portals for engineers:** Stepstone, Jobvector, Indeed;
- **Best job-portals for ICT professionals:** Jobvector, Stepstone, e-fellows.net;
- **Best job-portals for economists:** Stepstone, Yourfirm, Gründerszene Jobbörse;
- **Best job-portals for students, graduates and young professionals:** Staufenbiel Institut, Stellenwerk, e-fellows.net;
- **Best job-portals for pupils and those in vocational education and training:** Azubiyo, Azubi-plus, Staufenbiel Institut.

The rating shows that Stepstone dominates the rankings as it is rated the best online job-portal in three categories. Furthermore, it is interesting to see that engineers, ICT professionals and economists are identified as the most relevant groups of professionals for the activities of job-portals. Among the most important job-portals for these groups are well-known generalist online job-portals (primary and secondary) rather than highly specialised niche job-portals, which suggests a good coverage of these segments in the dominant generalist online job-portals (as a combination of primary and secondary portals). It is essential to note that students, graduates and young professionals as well as pupils and those in VET are identified as an important target group for the services of online job-portals. Finally, the rating shows that Xing and LinkedIn, which so far have been primarily known as social media networking websites for professionals, are building up their influence in the OJV segment.

3.2.3. Focus of the Private Online Job-portals

Generalist job portals publish OJVs across all industries and qualification levels. OJVs for positions with lower skill levels comprise a smaller overall share of the OJV market, as they are more quickly and easily filled. Moreover, these fields rely more heavily on word of mouth and the Jobbörse of the Federal Employment Agency. In industries with severe shortages of skilled labour, vacancies must be published on multiple sites to attract attention on the highly competitive market (E9).

Specialised online job-portals limit their selection of OJVs to individual sectors or qualification levels. Sector-specific portals such as www.bau-stellen.de (a construction-focused portal) and <https://jobs.springer-medizin.de> (for jobs in the health and elderly care sector) are less relevant than general online job-portals in Germany, but are often used by employers and job-seekers in combination with the latter (E2).

Large companies are in a better position to take advantage of private portals as they have greater resources and capacity available for recruiting. For example, a single OJV advertised for 30 days on Stepstone costs around €1,000. Often only large companies can take advantage at the price reductions available for higher volume OJV publication (E9).

²⁵ www.deutschlandsbestejobportale.de: Evaluation by employers and job-seekers on the basis of satisfaction and likelihood of referral. In 2017, more than 23,000 job-seekers and over 10,000 employers participated in the voting.

3.2.4. Outreach of the Private Online Job-portals

Altogether, the use of OJVs by companies in Germany is on the rise. According to an analysis by Textkernel, 3,639,592 OJVs were published to online job portals in Q2 2016 (Textkernel 2016), an increase of 500,000 OJVs over 2015. Once duplicate postings are taken into account, 1,987,027 OJVs remain. This means that OJVs are posted 2.2 times on average to different portals (Textkernel 2016). Some personnel service providers use a multi-channel tool, which enables the employer to select from a list of relevant primary online job-portals. Subsequently, the vacancy is automatically published in all of them (E8). Online job-portals also exchange their OJVs to increase their range. Due to these transactions in complex networks, experts' estimates of what share of vacancies are published as OJVs range from 50% to nearly 100% (E8).

3.2.5. Co-operation Between Public and Private Online Job-portals

The Federal Employment Agency co-operates with private online job-portals to increase the range of OJVs. The mutual transfer of job advertisements is an automatic process (E7, E8). However, this co-operation is not transparent as officially the PES have a neutrality mandate and are not allowed to favour individual online job-portals.

On the homepage of the Jobbörse, OJVs are advertised as originating from absolventa.de, [Yourfirm](http://Yourfirm.de), [Xing](http://Xing.de), germanpersonnel.de, regio-jobabanzeiger.de, stellenonline.de and jobware.de. However, it remains unclear whether this list is exhaustive. In the respective vacancies, the user is re-directed to the job portal from which the vacancy originated.

3.2.6. Role of Other Recruitment and Job-search Channels

When analysing data from the German Job Vacancy Survey we see that 52% of companies responded that their own website is the most common recruitment strategy (Table 5). This is followed by personal contacts with 50%. 49% of companies listed the Jobbörse as a common recruitment tool, particularly in East Germany.

Table 5: Search paths¹⁾ used for new hirings in the company in West and East Germany, 2015 (in %)

	West	East	Total
Own ads in newspapers or magazines	36	30	35
Vacancy on the own homepage	52	52	52
Vacancy in online job-portals (without the Internet services of the Federal Employment Agency) ¹⁾	41	41	41
Social Media (Xing, Facebook, etc.)	15	16	15
Contact to the Federal Employment Agency (without the Internet services of the Federal Employment Agency) and use of the Internet Services of the Federal Employment Agency	48*	54*	49
Choosing among unsolicited applications/list of applicants	29*	35*	30
Private labour market intermediaries	8*	15*	10
Internal ad	24*	20*	23
Via an employee/personal contacts	49*	53*	50
Choosing among apprentices, temporary workers/agency workers, internal trainees	6	6	6
Other search paths	2	2	2

*The differences between West and East Germany are significant at least on the level of 5%.

Source: Brenzel et al. 2016: 2.

Social media have also become an important recruitment channel rising by 11.5 percentage points to 28.1% of all OJVs between 2012 and 2014, whilst the share of OJV published in print has decreased from 18.4% in 2012 to 11.9% in 2014) (Weitzel et al. 2015a: 8f.) Social media appears to be more important to larger companies.

3.2.7. Expected Trends in the Online Job-portal Market

The expected trends in the online job-portal market concern the prices for posting OJVs on traditional online job-portals as well as the increasing use of social media for recruiting. Experts predict a potential price war over the online job-portal market, as there are currently too many providers with costs that are too high to sustain. As posting OJVs on online job-portals in Germany is considered to be relatively expensive in international comparison, there should be room for price cuts. As a result, consolidation into a few large job portal alongside niche platforms that specialise in individual industry groups (e.g. doctors or engineers) might take place (E9).

Mobile access to job-portals as well as social media is also expected to become an increasingly important part of online job-search (Zils 2015: 385). According to a survey, over half of companies (51.1%) have already carried out optimisation to make their company websites and OJV pages more accessible for mobile devices, but only 14% of companies have developed apps to enable easier OJV search from mobile devices (Weitzel et al. 2016: 9). Furthermore, over 60% of the sur-

veyed companies stated that they had an open mind about mobile recruiting. Predictably the ICT sector is more likely than average to consider mobile recruiting methods (76.5%) (Weitzel 2016: 4). However, the transition to mobile recruiting might take more time as many companies (41.5%) associate it with increased costs, especially because online job-portals use different standards. Furthermore, only three out of ten respondents believed that integrating mobile recruiting into the existing HR processes is easy (Weitzel et al. 2016: 5).

4. Use of OJVs in Recruitment and Job Search

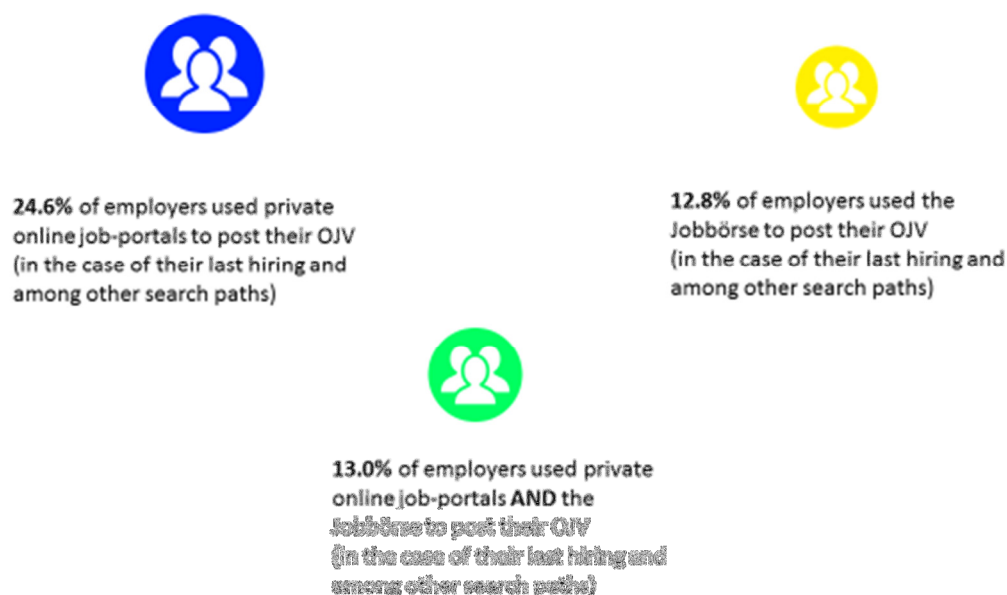
4.1. Use of OJVs in the Recruitment of Labour

As previously discussed in Chapter 2, factors such as the sector, the occupation, the skills level of the job, as well as the region in which the position is located can play a role in whether or not OJVs are the primary form of advertising the job opening.

According to the German Job Vacancy Survey, over 50% of new hirings in 2014 were published via private or public online job-portals (see Figure 4). In nearly 25% of the cases, a job opening was published as an OJV via a private online job-portal and not on the Jobbörse of the Federal Employment Agency. Conversely, only 12.8% of job openings were published on the Jobbörse of the Federal Employment Agency and not on the private online job-portals. Additionally, in the case of 13% of new appointments the employers published the job vacancies both on the Jobbörse and on the private online job-portals (see Figure 4).²⁶

²⁶ However, it needs to be taken into account that the German Job Vacancy Survey considers only the last hiring in a company, i.e. successful recruiting efforts. This means that cases where a search path did not end in a hiring (e.g. due to missing or unsuitable candidates) are not taken into account. Consequently, we have possibly limited insights into the search efforts of employers in sectors/occupations/regions with severe skills shortages. Also, as smaller companies in the construction and hospitality sectors are more likely to discontinue their recruiting efforts (Arnold et al. 2017: 20), in the Job Vacancy Survey this might lead to an underestimation of the use of OJVs in recruitment of these sectors.

Figure 4: Share of new hirings where employers published an OJV on public and/or private online job-portals (among other search paths), 2014



Source: Calculations by IWAK based on the German Job Vacancy Survey 2014. Icons from www.flaticon.com.

To understand whether the OJVs on private online job-portals display a bias towards certain sectors, a sector-level analysis was conducted by Thomas Körner and Martina Rengers (2016: 7). They compared sector-level data from the IAB Job Vacancy Survey with OJVs web-scraped from Stepstone and assigned them to sectors by using search filters.

Table 6 shows that the percentage distribution of OJVs by sectors on Stepstone does not consistently align with the distribution of the IAB Job Vacancy Survey. The juxtapositioning demonstrates that even though both the construction and ICT sectors experience shortages of skilled labour (see Section 2.3.), the former is under-represented and the other over-represented in the OJVs scraped from Stepstone. In the first quarter of 2016, for example, nearly 10% of vacancies in the IAB vacancy survey represented the construction sector, while only 3% of Stepstone OJVs came from this sector. By contrast, only around 4% of IAB vacancy survey data represented vacancies in the ICT sector, whereas 15% of OJVs on Stepstone could be assigned to this sector.

Table 6: Comparison between data from IAB Job Vacancy Survey and web-scraping data from Stepstone (Q1 2016)

No.	NACE sections	economic activity sector	Job Vacancy Survey 2016q1		Jobboard Stepstone (07.09.2016)		Jobboard Stepstone (04.10.2016)	
			absolut	%	absolut	%	absolut	%
1	A	agriculture, forestry and fishing	12,700	1.3	-	-	-	-
2	B, D, E	mining /energy and water supply/waste management	6,100	0.6	1,164	2.1	1,157	2.1
3	C	manufacturing	107,900	10.9	15,433	27.8	15,291	27.6
4	F	construction	94,400	9.5	1,689	3.0	1,721	3.1
5	G	wholesale and retail trade; repair of motor vehicles and motorcycles	107,100	10.8	4,045	7.3	4,102	7.4
6	H	transportation and storage	54,100	5.5	1,973	3.5	2,009	3.6
7	J	information and communication	35,300	3.6	8,333	15.0	8,238	14.8
8	K	financial and insurance activities	17,600	1.8	3,809	6.9	3,735	6.7
9	L, M, N	business services	260,800	26.4	6,461	11.6	6,382	11.5
10	I, P, Q, R, S	other services	272,200	27.5	7,864	14.1	7,818	14.1
11	O	public administration/social security	20,500	2.1	-	-	-	-
		Other sectors	-	-	4,810	8.7	5,027	9.1
12		Germany	988,700	100%	55,581	100%	55,480	100%
					61,565*		60,320*	

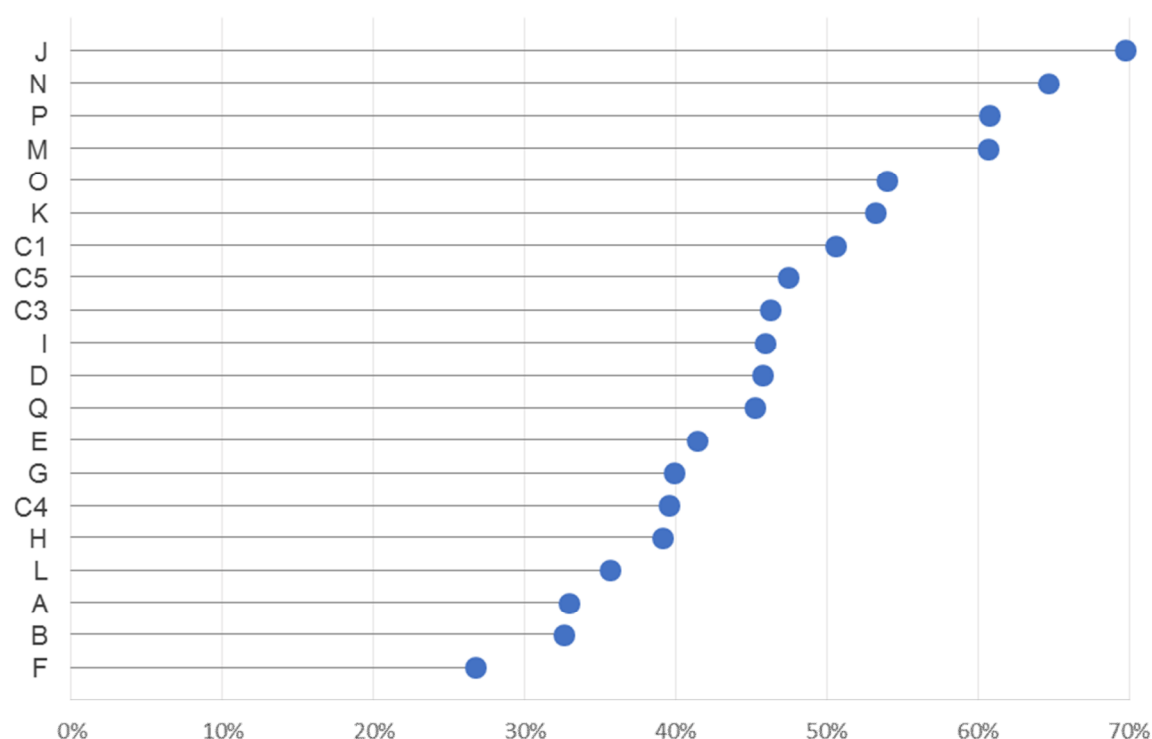
* Search result without using search filters

Source: Körner and Rengers (2016: 7).

When interpreting Table 6, several methodological limitations have to be considered. To start with, the classification of sectors used by Stepstone does not conform to the NACE classifications. For a more fitting comparison, sectoral data would have to be compared with the trade register or full text analysis of the entire job advertisement on Stepstone would be required (Körner and Rengers 2016: 8). Furthermore, the filters used during web-scraping were not able to assign every OJV to a sector. Nearly 15,000 OJVs could not be considered in the evaluation of Stepstone. Finally, duplicate OJVs (found both within and across sectoral categories) represented a challenge to collecting accurate data (Körner and Rengers 2016: 7). Despite these methodological limitations, the study confirms the relevance of the sectoral dimension when analysing employer behaviour in recruitment by indicating that some sectors are more/less likely to post to generalist online job-portals.

IAB data from the Job Vacancy Survey presented in Figure 5 reinforce these results. When analysing how often companies published OJVs on the public and private online job-portals, this recruitment path appears less important in the construction sector and very important in the ICT sector. These results are further confirmed by our construction sector expert's opinion that construction jobs are more likely to be advertised via personal contacts than on online job-portals (E3). This has to do with

Figure 5: Share of new hirings in 2014 where private and public online job-portals were used (among other search paths)



J Information and communication; N Administrative and support service activities; P Education; M Professional, scientific and technical activities; O Public administration and defence; compulsory social security; K Financial and insurance activities; C1 Nutrition; C5 Machine; C3 Chemicals; I Accommodation and food service activities; D Electricity, gas, steam and air conditioning supply; Q Human health and social work activities; E Water supply, sewerage, waste management and remediation activities; G Wholesale and retail trade; repair of motor vehicles and motorcycles; C4 Metal; H Transportation and storage; L Real estate activities; A Agriculture, forestry and fishing; B Mining and quarrying; F Construction.

Source: Own calculation based on the IAB Job Vacancy Survey (2014).

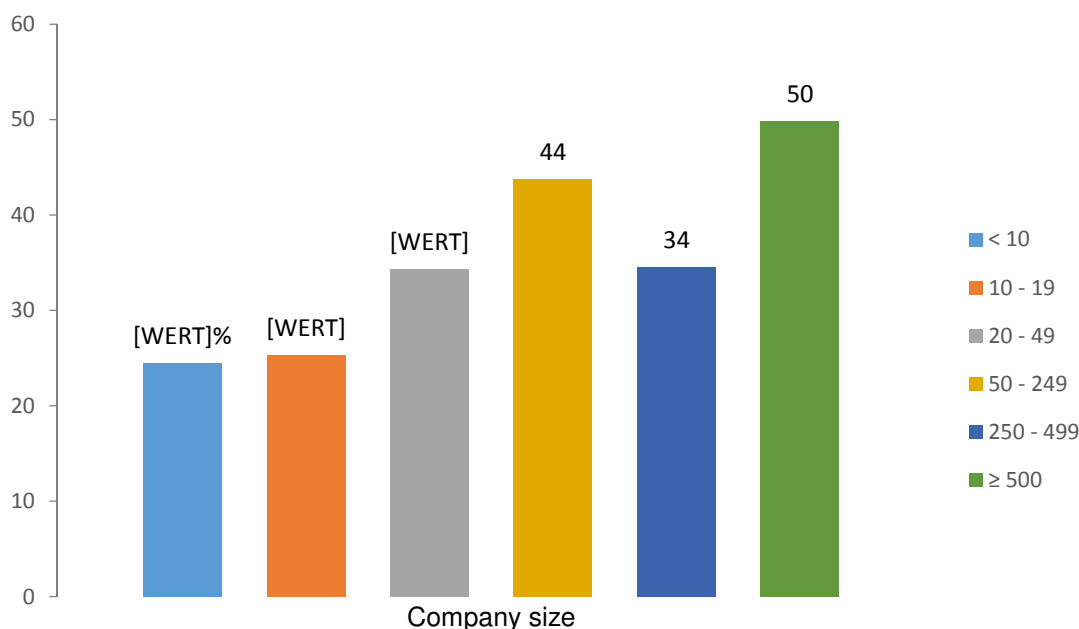
The occupations for which OJVs are used as a recruitment path are in the field of production (10.5%), administration and customer support (10.3%), healthcare (9.9%), ICT (9.6%) as well as sales and trade (9.3%) (Textkernel 2016). As already noted in Chapter 2, the professions which are currently experiencing a shortage of specialist staff are warehouse workers, office professionals, IT developers, salespersons and elder care nurses (Textkernel 2016).

As mentioned in Section 2.4., region is also a determining factor in the use of OJVs in Germany. According to experts, companies in rural regions mostly fill their vacancies via personal contacts, whereas large cities where social ties are weaker vacancies are mostly published online. In the case of the health and elderly care sector, the urban-rural divide manifests itself differently: the renowned hospitals in the cities do not find it difficult to recruit qualified candidates, whereas smaller hospitals in rural areas do and are therefore more likely to publish OJVs than their urban counterparts (E4).

The size of a company also plays a role, as shown in Figure 6. Small companies generally use OJVs less frequently than very large companies, in part because they have fewer resources and are less likely to benefit from volume discounts offered by private portals (see Section 2.2.). The

lower likelihood that SMEs will advertise via OJVs is significant for the overall use of OJVs in Germany as the labour market is dominated by SMEs. In 2014, 99.3% of companies were characterised as SMEs and 61% of the German workforce was employed by SMEs (Statistisches Bundesamt 2016). SMEs are particularly dominant in the construction and hospitality sectors.

Figure 6: Share of hirings, where private and public online job-portals were used (among other search paths), 2014 (in %)



Source: Own calculation based on the IAB Job Vacancy Survey (2014).

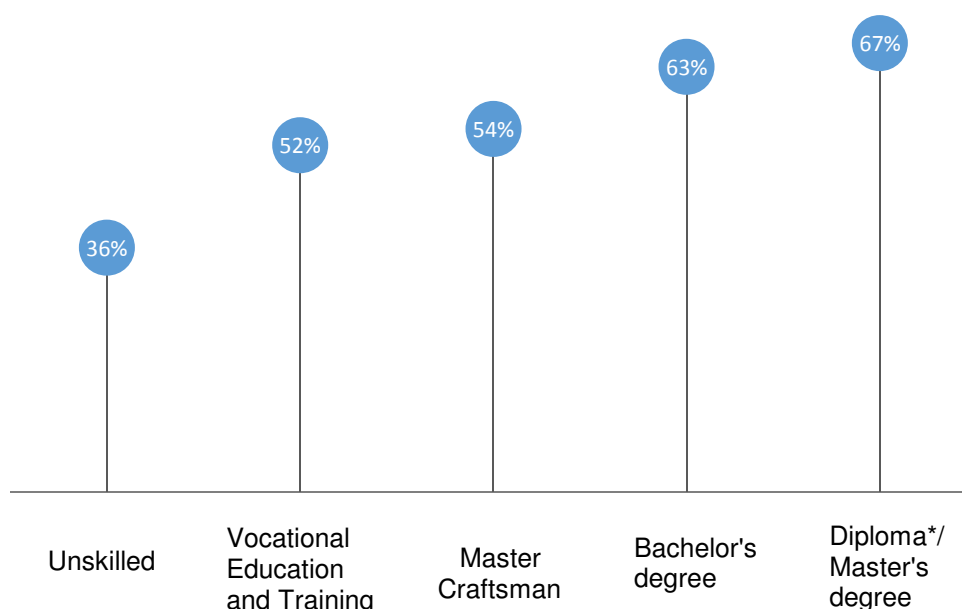
The survey of the largest 1,000 companies in Germany found that in 2014, 90.4% of vacancies were published on the company website, 70.1% of vacancies were published on online job-portals, and 30.5% were published in the Jobbörse (Weitzel et al. 2015a: 8f.). The share of these channels has remained constant since 2012. On the contrary, the share of OJVs published in print has decreased from 18.4% in 2012 to 11.9% in 2014 (Weitzel et al. 2015a: 8f.). Despite the possible methodological weaknesses of the study, it nevertheless indicates that in larger companies the posting of vacancies as OJVs on the company website or on online job-portals is widespread.

In addition to having more resources for recruiting and profiting from quantity discounts when posting OJVs, large companies can also contract labour market intermediaries for the recruiting process (e.g. Personalwerk or the Königssteiner Agentur) and benefit from even steeper discounts that these agencies receive on OJV portals (E9). However, outsourcing the recruitment process to labour market intermediaries is only cost-efficient for companies looking to publish 80-100 OJVs per year.

SMEs often have less standardised processes for publishing vacancies and may have less recruitment expertise within their companies (E1, E2, E6). As a result, they are more likely than large companies to rely on services offered by the Federal Employment Agency, such as posting OJVs for free and making use of the support services offered by the PES advisers (E9). This trend, while reported by our experts, could not be confirmed through the IAB vacancy survey.

The experts emphasised that the skills level required by a vacancy is a critical factor in determining the vacancy is published online or not. Figure 7 shows the OJV share of new hirings in 2014 by required skills level.

Figure 7: Share of new hirings where private and public online job-portals were used (among other search paths) and the qualification level of the position, 2014 (in %)



*Diploma is a former academic degree in Germany, equivalent of both Bachelor's and Master's degree (see Footnote 8).

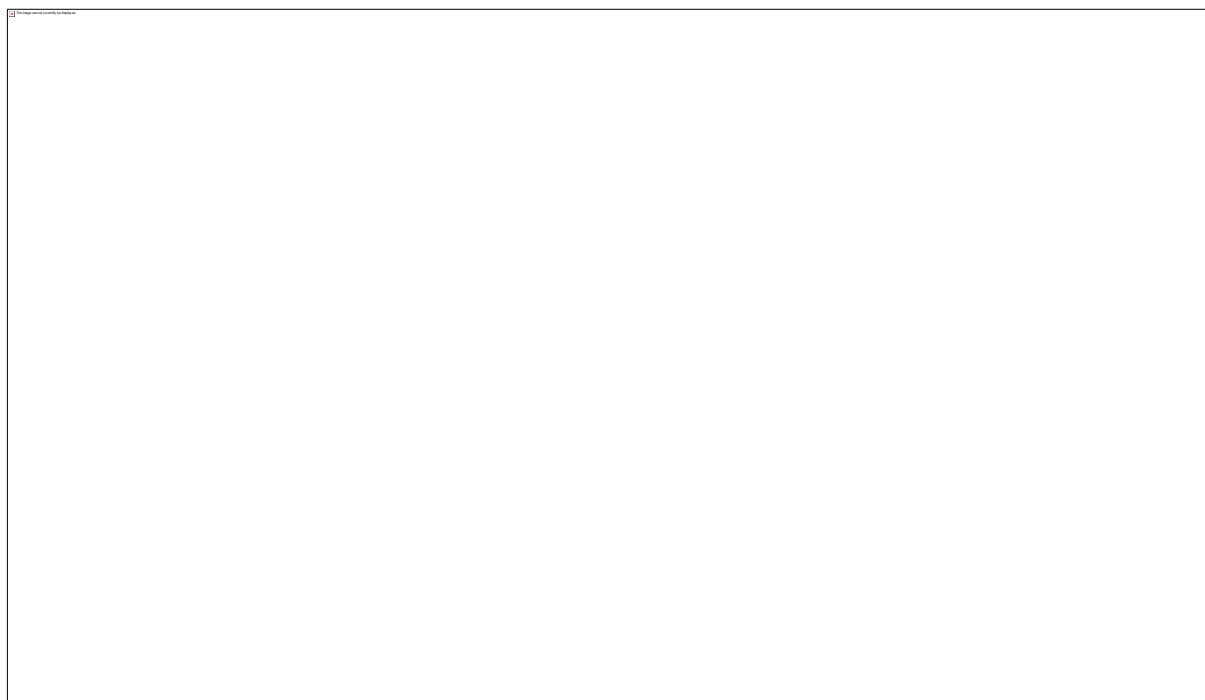
Source: Own calculation based on the IAB Job Vacancy Survey (2014).

The higher the skills level of the job, the more likely the position will be advertised via online job-portals. Furthermore, in 2014, new appointments of unskilled workers were only filled via public or private online job-portals in 36% of the cases. By contrast, two out of every three new appointments requiring at least a Master's degree were published on job portals. According to our interviews, when recruiting specialist staff, particularly in sectors experiencing shortages of skilled labour, the potential target group of the OJV is so limited and the competition for the applicants so pronounced that the target group has to be addressed in a strategic manner (E8). The most common strategies on specialist level include the use of large generalist online job-portals, such as Stepstone and Monster, as well as using recruitment agencies. Assistant and administrative positions in many sectors are often filled through temporary work agencies. Leadership roles are generally filled through recruitment consulting firms and head-hunters. For blue-collar workers in occupations experiencing shortages of skilled labour the word-of-mouth or offering of apprenticeships are used. Recruitment taking place at an early stage of VET can be observed in the case of the health and elderly care sector where the employers establish contacts to nursing schools (E4). Furthermore, sectoral associations and chambers of commerce are also important recruitment tools and professional journals such as "Die ÄrzteZeitung" (the Doctors' Newspaper) are frequently used to advertise healthcare vacancies. This journal also has its own website, "ÄrzteZeitung Online", with its own career portal.

4.2. Use of OJVs in Job-search

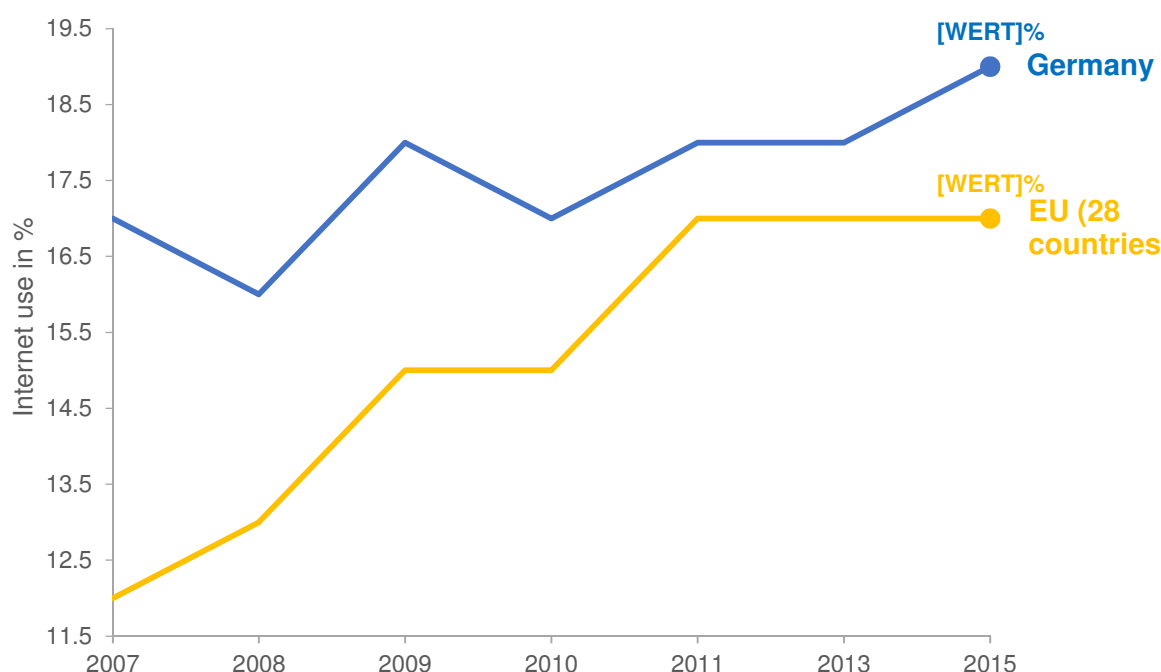
Identifying relevant online job-portals, navigating them and finding suitable job offers among the large number of OJVs requires digital skills from job-seekers. Internet use in Germany is relatively high and serves a variety of work and leisure purposes. Figure 8 shows that individuals most responded that they use the Internet to seek health-related information and next most commonly for internet banking. 19% of individuals surveyed use the Internet for job search or sending an application, which is slightly above the EU-28 average.

Figure 8: Internet use of individuals by purpose (in %)



Source: EUROSTAT ICT Survey of Households and Individuals [isoc_bde15cua; tin00102; tin00101; tin00099; tin00032; tin00127] (downloaded on 19 January 2017).

Over the years, the share of people in Germany who use the internet to search for and apply for jobs has remained relatively stable over time, displaying only a slight increase between 2007 and 2017 (see Figure 9).

Figure 9: Internet use: job search or sending an application, all individuals, 2007-2015 (in %)

Source: EUROSTAT ICT Survey of Households and Individuals [isoc_ci_ac_i] (downloaded on 11 January 2017).

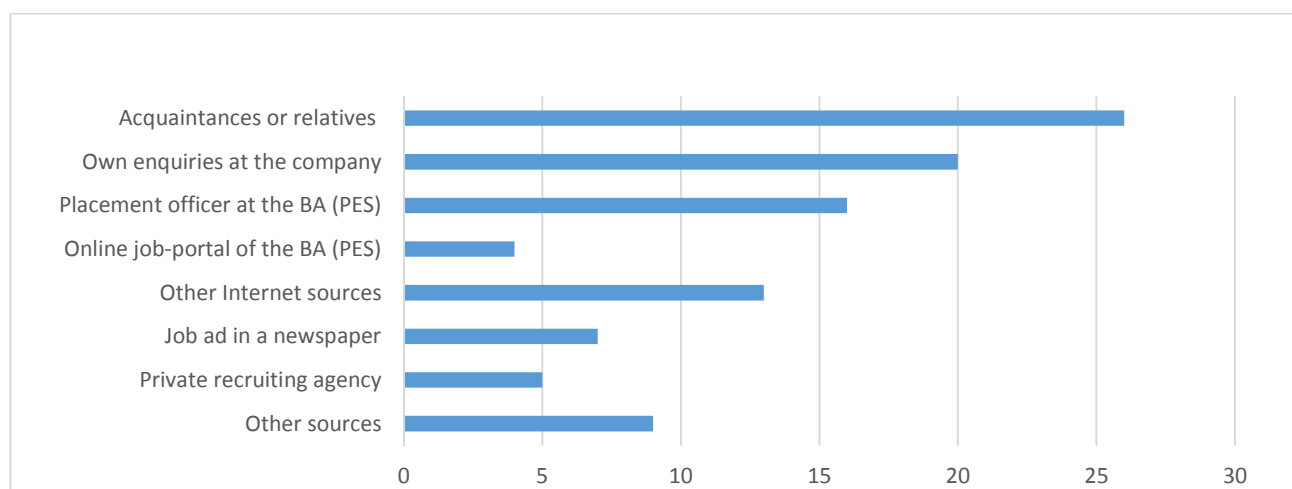
Job-seekers consider multiple channels to be helpful in successfully finding a job. According to an online-survey commissioned by Monster.de among 7,040 respondents, 52.2% use online job-portals, 42.2% work with personnel consultants/head-hunters, while 39.5% use company websites and the same response level indicated use of personal networks (39.5%) (Weitzel et al. 2015b: 40). The Manpower survey of 1,015 job-seekers shows that 54% of the respondents read job advertisements in newspapers, 43% look for jobs on the PES job portal and 40% search for a job in online job portals such as Stepstone and Monster, while 39% use search engines such as Google and 38% look for jobs directly on company websites (Manpower 2016: 5).

Personal characteristics play a significant role in the use of the Internet for job searches. Unemployed individuals are predictably the labour category most likely to use the Internet for job-search or sending in an application, followed by students (Eurostat ICT Survey of Households and Individuals [isoc_ci_ac_i] in the Guidance Note). While unskilled workers are less likely to search for a job online than skilled workers, among skilled workers the level of formal education does not seem to be a major determining factor in the use of the Internet for job searches and applications. The differences in percentages are within a margin of 3-4% at maximum (Eurostat ICT Survey of Households and Individuals [isoc_ci_ac_i] in the Guidance Note). The expert interviews confirmed that low-qualified workers, like the long-term unemployed, need more support and advice when searching for jobs (e.g. E6).

The survey of Panel Labour Market and Social Security (PASS)²⁷ serves as a first point of reference for the results job-search of long-term unemployed (see Figure 10).

²⁷ In German "Panel Arbeitsmarkt und Soziale Sicherung" (PASS) (see Trappmann et al. 2013 for an overview of the survey and Berg et al. 2016 for the codebook of the survey).

Figure 10: Job-search channels that lead unemployed persons to taking up a job subject to social security benefits (in %), 2014-2015

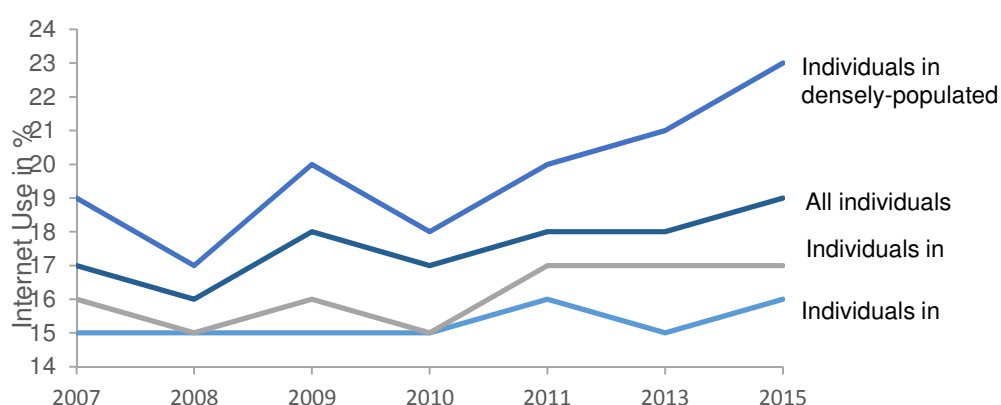


Source: Beste and Trappmann (2017: 8).

The data show that in 26% of the cases unemployed persons found a new job based on personal contacts. 20% of the respondents were employed after they had contacted the company directly. In 20% of the cases, the placement services of the PES (both the Jobbörse and the placement officers at the PES) helped the long-term unemployed to find a job and 13% of the respondents found the job based on the information from the Internet. However, as the data source does not differentiate between different forms of Internet sources, we do not know if the respondents were referred to information from online job-boards, social media or company websites. Furthermore, the survey covers only successful search paths, i.e. those that led to employment subject to social security benefits. It is very probable that job-seekers combine different sources when looking for a job and thus the outreach of the online job-portals is in terms of visibility and usage much higher.

A region's population density also affects the use of the Internet. The more densely populated a region is, the more likely its residents are to use the Internet for job searches (see Figure 11).

Figure 11: Using the Internet for job search or sending an application in Germany by population density of area, 2007-2010m (in %)



Source: EUROSTAT ICT Survey of Households and Individuals - internet activities [isoc_ci_ac_i] (downloaded on 11 January 2017).

In addition, experts estimate that the age of the job-seekers plays a role in how the Internet is used for job searches. Generations X and Y are most likely to use online job-portals, while Generation Z prefers meta search engines such as Google (E11).

Among job-seekers, laptops are the preferred device when researching information on potential employers (66.2%) compared to smartphones (30.3%) and tablets (28.1%). Similarly, when looking for jobs from home, 93.9% use computers/laptops, 54.4% use tablets and 42.1% use smartphones. When searching for a job at workplace, 29.5% of respondents use computers/laptops, 5.1% use tablets and 13.4% use smartphones. Only when searching for a job while travelling are smartphones the preferred device (40.7%), followed by laptops (23.4%) and tablets (20.6%) (Weitzel et al. 2016: 8). In contrast, a survey conducted by Indeed in 2014 claimed that 60% of respondents in Germany use smartphones to search for jobs and over half of them consider optimisation for mobile use more important than the design of the portal and the information contained in the vacancy (Indeed 2014: 3). It is essential to note that most of the job-seekers using mobile devices for job search are younger than 25 years (80%) (Indeed 2014: 6).

4.3. Expected Trends in the Use of OJVs in Recruitment and Job-search

Due to the ever-progressing digitalisation, both the Internet and online job-portals will become increasingly more important to the job-search process. Furthermore, due to the growing shortages of skilled labour it is becoming even more important to use all available channels when trying to fill a vacancy (E6). Therefore, in the future companies that have the necessary resources may choose to outsource much of the recruitment process to labour market intermediaries (E8).

Social media will also become more important in recruitment (E6, E8, E10). According to our interviews, one of the advantages associated with the use of social media is the opportunity to target specific groups, as it is possible to use filters regarding gender, age and even interests. The trend will continue towards short and easily absorbable announcements, which will be partially posted as video sequences on social media platforms (E8).

5. Identifying Online Job-portals for Web-crawling

5.1. Documentation of the Job-portal Research Process

5.1.1. Identifying the Online Job-portals Through Google Search

Relevant job-portals were identified through Google searches and through recommendations from our experts. In particular, the consulting firms were able to advise on the most important portals for specific career stages, sectors and regions (E5, E11) (see Annex 3). To identify relevant job-portals through Google, we used the following search terms:

Table 7: Grid for documenting the Google search for job-portals

Search terms		Number of results
German	English translations	
“Jobsuche”	Job-search	9,990,000
“Jobanzeigen”	Job adverts	326,000
“Jobangebote”	Job offers	5,470,000
“Jobbörse”	Job-portal	9,170,000

Source: IWAK.

As each search term returned an extremely high number of results, we limited our review to the first five pages of results as we assumed that most employers and job-seekers would likely focus their recruiting and searching efforts on earlier results as well. We recorded each portal in the order that it appeared on Google, noting whether the portal appeared as a paid ad or as a regular result. The resulting sponsored ad portals and regular results portals are documented in Annex 1 and Annex 2, respectively. Many of the online job-portals returned in the sponsored ads were large general portals such as Monster and Stepstone, and they also appeared in the regular results. Many of the regular results also included job portals for large companies and university job portals. Furthermore, we used Alexa to determine the ten most visited job-portals in Germany (see Annex 3).

Ultimately, 47 portals were identified as highly relevant to the German labour market (see Annex 4).

5.1.2. Identifying the Online Job-portals Through Expert Interviews

Overall, the interview partners indicated that while the expectations for OJVs differ based on sector, it is possible to identify rough structures, common formats and content similarities across industries. Interestingly, regardless of sector, interview partners considered many of the same job portals to be the most relevant.

5.1.3. Validating the Selection of Online Job-portals

In the view of our interview partner from the Federal Statistical Office, the list of selected portals is comprehensive and covers the online job-portal market very well. However, they pointed out that:

- The online job-portal market is changing very quickly;
- Several portals like Monster.de limit the number of displayed OJVs;
- The data stock will contain considerable duplications of OJVs;
- From the viewpoint of the Federal Statistical Office, the stock of data that will be built up through web-crawling will need to be carefully assessed for data quality. Furthermore, in the experience of the Federal Statistical Office web-crawled data is biased in terms of sectors and it is difficult to connect it with other sources of data.

While the last points are very valid, they show that Statistical Offices in web-crawling aim at creating data stocks that are of equal value and quality as the statistical databases, which limits their willingness and ability to work with such data.

5.2. Conditions for Drafting and Posting OJVs in the Selected Job-portals

5.2.1. Drafting and Posting an OJV on the PES Online Job-portal

The employers can report a vacancy to the Federal Employment Agency after they have registered themselves and received a user name and a password for accessing the system. The form used by the Federal Employment Agency is highly standardised and requires the employer to:

- Provide contact information for the company;
- Specify whether the vacancy should be published on the Jobbörse or not;
- Provide the job title, number of persons required, starting point for employment, location;
- Describe the job and the specific tasks;
- State the duration of employment (temporary/permanent) and working time (full-time/part-time; time of the day; seasonal work/shift work, flexitime; number of working hours);
- Provide the gross salary/wages (per hour/month) and state whether it is subject to tariff commitment; the employer is asked to confirm whether this information may be published;
- Describe the applicant they are seeking (ticking pre-defined boxes for formal qualifications, work experience, necessity for a driving licence/car);
- Describe in free text the desirable hard and soft skills of the applicant;
- Tick the pre-defined boxes containing skills:
 - Methodological skills: ability to analyse and solve problems, ability to grasp the situation, ability to decide, holistic thinking, ability to organise;
 - Activity and implementation skills: ability to cope with stress, self-initiative, motivation/readiness to perform, independent working, determination;
 - Social skills: empathy, leadership, communication, customer orientation, ability to work in teams;
 - Personal skills: flexibility, creativity, readiness to learn, caution and accuracy; reliability.

The employers can request for support by the PES personnel in form of consulting on the phone or in their company.

5.2.2. Drafting and Posting an OJV on a Private Online Job-portal

We selected Stepstone and Indeed as they represent a highly relevant general primary online job-portal and a job-search engine.

To post an OJV to the **Stepstone** portal, one must first choose one of three packages presented in Table 8.

Table 8: Overview of the available packages on the Stepstone website

Starter	Professional	Premium
€ 920	€ 1,195	€ 1,695
<ul style="list-style-type: none"> • 30-day period • Update after 15 days • Publication on partner websites • Re-targeting in advertising network • Personal contact partner • Company description • Text layout with logo 	<ul style="list-style-type: none"> • 30-day period • Update after 15 days • Publication on partner websites • Re-targeting in advertising network • Personal contact partner • Company description • Individualised layout of your design • Repeated placement in Job Newsletter 	<ul style="list-style-type: none"> • 30-day period • Update after 15 days • Publication on partner websites • Re-targeting in advertising network • Personal contact partner • Company description • Individualised layout of your design • Repeated placement in Job Newsletter • Job emailed to target groups • Priority display in results list • Ad optimisation by experts
30-day extension 595 €	30-day extension 595 €	30-day extension 595 €

Source: Stepstone.

Posting a “Starter” ad on Stepstone involves four steps.

Step 1: Register providing the following information:

- First name;
- Last name;
- Company name;
- Contact number.

Step 2: Select posting options:

- Decide how many OJVs you want to post (the price decreases when you select to post more OJVs). The maximum option is five OJVs, for which the price is €807.65 per OJV;
- Decide whether to submit the OJV now or later (customers can submit OJV information up to one month after the purchase date).

Step 3: Submit OJV data in the following categories:

- Company description free text (mandatory);
- Position title free text (mandatory);
- Job description as free text (mandatory);
- Company logo upload (optional);
- Contact person data (optional) – first name, last name, position, email address, contact number, mailing address, company website.

Step 4: Once all desired information has been entered, a preview is available and the user can proceed to the payment page.

The process is the same for “Professional” and “Premium” ads, except in Step 2 where instead of filling in various free text sections, users are instructed to upload a Word, PDF or HTML layout of the completed OJV.

Posting an OJV to the **Indeed** portal involves four steps.

Step 1: Register with an email address and a password or using a Google or Facebook account.

Step 2: Create an account providing the following information:

- Company name (mandatory);
- Company size: 1-49; 50-149; 150-249; 250-499; 500-749; 750-999; 1000+ (dropdown menu; optional);
- Name of person opening account (mandatory);
- Contact number (mandatory);
- How you heard about Indeed (dropdown menu; optional).

Step 3: Submit an OJV basic data: title, company, zip code (mandatory).

Step 4: A pop-up window allows the user to determine the “Job Budget”, indicating how many times the job should appear on the site. The daily average is set at €3 indicating that the job will be advertised twice, whereas €30 would be associated with 15 ads. In fine print there is also an option to publish OJVs for free.

The following information is requested to publish a free OJV to Indeed:

- Language in which the OJV should be published (drop-down menu; optional);
- Contract type (mandatory);
- Salary range with optional free text and drop-down menu for the time span (per month/hour/annum) (mandatory);
- Job description (minimum 30 characters; mandatory);
- Application preference (whether you prefer to receive applications by email or personally) and whether a CV is required;
- Confirmation of all information and upload of the OJV to the website.

5.3. Contacting the Job-portal Owners

The owners of the 47 portals identified as relevant for web-crawling were contacted in July (see Annex 4). None of them replied directly to IWAK or provided an API address.

6. Format and Content of OJVs

6.1. Legal/Regulatory Framework

For a long time, discrimination in job vacancies was associated with gender, especially as it was customary to use the masculine form of a job title or position to address both women and men (e.g. “Berater” for a consultant). Over time, however, gender-specific language within vacancies has decreased. While a study of vacancies between 1968 and 1984 showed that 90% of them used gendered terms, the number dropped to 33% for the year 1997 and 6% for the years 2007-2008 (Bauhoff 2013, Kraft 2017: 243).

The introduction of the **General Equal Treatment Act (AGG)**²⁸ in 2006 further supported this trend. Among other things, the AGG regulates the wording in job vacancies, selection of applicants, job interviews, assessment of employees, remuneration, employment references, layoffs and company pension schemes (Kraft 2017: 231). In addition to stating that the wording of job vacancies should not disadvantage or exclude candidates based on gender, it also forbids discrimination based on race, ethnicity, religion or belief, disability, age and sexual orientation (§11 AGG).

The law had its broadest impact on OJV content related to forms of discrimination that it explicitly defined for the first time (most notably age). The passage of the act heightened employer awareness of certain types of discrimination, particularly among employers from SMEs (Bauhoff 2013). Gender-related violations of the law in job ads are relatively easy to detect and prove, however age discrimination constitutes a more ambivalent category. Wordings such as “young team” could denote a team comprised of young persons or a team that has been established only recently (Kraft 2017: 238f.). Court decisions have underlined the importance of context-dependency, stating that it is acceptable to use age-related wording when describing the company or employer. However, age-related wording may not be used to describe open positions or the potential benefits of employment (Kraft 2017: 239). Likewise, it is permissible to use the word “junior” to describe a position (e.g. Junior-Consultant), since it refers to status within the company hierarchy and implies the candidate’s level of experience rather than the desired age of an applicant (Kraft 2017: 239f.). Employers may, however, advertise a job via channels which restrict the range of recipients in terms of gender, age or religion (e.g. publishing a job ad in a women’s or youth magazine or a church newspaper).

OJVs in the public sector explicitly refer to the legal framework stating that they will adhere to the principles of equal treatment throughout the recruitment process. Furthermore, specific agendas promoting women and migrants or the inclusion of disabled people in the labour market are allowed. Accordingly, women and sometimes applicants with a “migration background” are often explicitly encouraged to apply for specific positions and some OJVs state that, given equal ability, severely disabled persons will be preferred.

Another law influencing the content of OJVs is the **Part-time and Temporary Employment Act (TzBfG)**²⁹ that came into force on 1 January 2001. It states that all jobs suitable for part-time employment must be advertised as such. The minimum wage, implemented 1 January 2015 is also sometimes references in OJVs (increased to €8.84 as of 1 January 2017).

²⁸ Allgemeine Gleichbehandlungsgesetz (AGG),

http://www.antidiskriminierungsstelle.de/SharedDocs/Downloads/DE/publikationen/AGG/agg_gleichbehandlungsgesetz.pdf?__blob=publicationFile.

²⁹ Teilzeit- und Befristungsgesetz (TzBfG): <http://www.gesetze-im-internet.de/tzbf/index.html>.

The employer is ultimately legally responsible for the content of a job ad, regardless of whether the ad was produced by an internal team or external providers (e.g. head-hunters or employer service providers or the Federal Employment Agency) (Kraft 2017: 242).

6.2. Format of OJVs

German employers tend to format OJVs differently than employers in other countries, preferring to publish OJVs using corporate brand layout rather than using text fields provided by an online portal and supplemented with a company logo (E10). OJVs must be uploaded as pdf files when companies prefer to maintain their branding or design (E9). A study comparing product ads and job ads of 125 employers in Germany and Austria showed that 74% of them used consistent corporate design in their ads (Stumpf 2017: 98). However, only 29% of the companies used the OJV for employer branding intending to position their company in relation to its competitors (Stumpf 2017: 97).

Use of logos and pictures in OJVs can symbolise company values or area of activity and do not generally entail additional costs for employers using private portals (E5, Szwed 2017: 145). A study analysing job vacancies in print magazines found that pictures of hands were included in job advertisements trying to stress the value of team work (e.g. carrying a trophy or reaching out for each other's hands) (Luttermann 2017: 69). On the contrary, career-growth opportunities were expressed through images of skyscrapers, stairs, fast-growing plants such as bamboo, tall trees or world maps. Activities in a globalised world and international networks were symbolised by a globe or a climbing net (Luttermann 2017: 69). OJVs also use pictures to denote certain company values or the required personality traits for the job opening, e.g. chess figures signifying strategic thinking (Szwed 2017: 145).

Most OJVs are written in German, although the use of English can be widespread depending on the sector and qualification level. An analysis of the OJVs in the DAX 30 companies (Simbeck et al. 2017: 43) showed that in the automotive sector, most of the OJVs on the company career websites were in German (e.g. BMW, Volkswagen, Daimler) whereas in ICT and technology companies the majority of OJVs were drafted in English (e.g. Continental, SAP). In the fields of pharmaceuticals and finance/insurance the trend is moving towards using English in OJVs (e.g. Merck, Bayer and Deutsche Bank), although there are still companies where the majority of OJVs are issued in German (e.g. Commerzbank). The degree of internationalisation in terms of business activities (e.g. export activities, subsidiaries) enhances the likelihood that the OJVs are written in English – the best examples being Adidas and Henkel where the clear majority of OJVs were issued in English (Simbeck et al. 2017: 43).

The OJVs designed by SMEs are more likely to be in German and do not generally experiment with different formats. Most often, they contain information about the job title/job position, a list of requirements for the potential candidate and the benefits offered by the employer. This has to do with the fact that SMEs use OJVs less for employer branding and more for filling an actual vacancy (Immerschitt and Stumpf 2014: 113). However, as many employers are experiencing shortages of skilled labour, employer branding is becoming more important as a competitive strategy. Consequently, OJVs are becoming a strategic tool in communication and competition (Luttermann 2017: 56). Corporate OJVs, by comparison, are more likely to use long paragraphs to describe positions as well as to incorporate branding into OJVs by uploading pdf files using company layouts to OJV portals.

6.3. Content of OJVs

The job positions in the OJVs are often quite detailed (e.g. not just “Controller”, but “IT-Controller”, “Production Controller”, “Financial Controller”) (Immerschitt and Stumpf 2014: 69). In many cases, the job position is in English, e.g. “Senior Consultants – Inhouse Consulting”, “Senior Solution Developer Output Management” or is expressed in a mix of German and English “Teamleiter für IT Projectlead Cross Divisional Finance Processes Insurance” (Szwed 2017: 145). Job titles often use English, but in some cases pseudo-Anglicisms appear, such as “Cutter” standing for a “film editor”.

Applicants are addressed in German using the formal second person (“Sie” instead of “Du”) (Luttermann 2017:63). The descriptions of tasks and the desired profiles of the applicants, including formal qualifications, work experience, knowledge of necessary standards and regulations as well as software and language skills, are usually very detailed (Szwed 2017: 147).

Soft skills are often described in OJVs, but in some cases they have become just empty phrases. Consequently, skills like “able to communicate”, “motivated”, “capable of working in a team” do not say much about the task profile of the vacant position (Eggert 2015: 70). The most frequently requested soft skills are creativity, analytical thinking, persuasiveness, decisiveness, and the ability to communicate. Anglicisms are often used here as well, e.g. “In-house Services”, “Global Player”, “Integration von BackEnd-Daten” (Szwed 2017: 147). Our interviews showed that because of digitalisation, IT skills are now referred to in OJVs even in sectors where they were not previously considered relevant (e.g. machine engineering and retail, E1 and E2). In some technical sectors, formal qualifications are still emphasised more in OJVs than skills or personality traits (E1).

As mentioned above in Section 6.1., in Germany it is crucial to consider the use of feminine or masculine forms of job titles/positions in OJVs. As the generic male form has been rendered incorrect by the AGG, there are different ways of expressing that applications from both men and women will be equally considered (Demarmels 2017: 252):

Table 9: Different possibilities for expressing gender-sensitivity in job-titles

1	Berater (m/w)	Consultant (m/f)
2	Berater/-in	Male consultant/female consultant
3	Berater/Beraterin	Male consultant/female consultant
4	BeraterIn	Male consultant/female consultant
5	Beratende	Those who are consulting (gerund, plural)
6	Person/Mensch/Kraft	Person/human (as in “individual”)/staff member (generic gender-neutral terms for a person)
	Berater	Male consultant – not acceptable

Source: IWAK/Demarmels 2017: 52.

Research has shown that these different wordings have varying effects on job-searchers. Women are found to be more likely to apply for a particular job if the female and male forms are written out completely (version (3) in Table 9) than if the male form is used followed by the addition (m/w) (version (1) in Table 9) (Demarmels 2017: 262). It is possible to circumvent gender issues by using English terms for job positions (e.g. “Operations Specialist”), which would partly explain their popularity.

In Germany, no hidden “code” for formulating OJVs exists. However, OJVs can be phrased in a certain way to conceal unattractive working conditions or tasks, such as:

- You take the pressure off the head of division (= you will be required to perform administrative tasks such as organising travels or preparing meetings following the instructions of the management);

- You will be responsible for general organizational tasks (= everybody will load off their work on you);
- You are flexible and resilient (= your working hours are not clearly defined and the working environment is stressful) (Eggert 2015: 69).

Furthermore, employers have subtle ways to attract or discourage certain kinds of candidates, e.g. through using words traditionally associated with masculine stereotypes. Research has shown that this enables them to attract more male candidates (Simbeck et al. 2017). The following skills or traits are often associated with masculine stereotypes: “ability to cope with pressure”, “analytic skills”, “negotiating skills”, “assertiveness”, “ambition”, “decisiveness”, “willingness to travel” and “mobility” (Hentschel and Horvath 2015). A study analysing OJVs in the field of Human Resources (HR) and Software Development (SD) shows that at least one stem word carrying masculine stereotypes was represented in 65% of the OJVs posted on the company career websites³⁰ (Simbeck et al. 2017). Whilst 70.7% of the OJVs of the DAX 30 companies in the sample displayed a stem word connoting a masculine stereotype, this share was 60.7% in the OJVs issued by SMEs and only 49.2% in the field of public administration (Simbeck et al. 2017: 44). Surprisingly, there were no significant differences in the use of words connoting male stereotypes between the fields of HR and SD.

A study involving the analysis of 311 job vacancies in Germany categorised the representation of company values according to the value appeal categories of Geert Hofstede and Shalom H. Schwartz (Crijns 2017: 170). The following words/concepts were found in the job vacancies to express the different categories of company values (Crijns 2017: 171ff.):

- Individualism: flat hierarchies, responsibility, sportiness, health, work-life-balance;
- Collectivism: team spirit, co-operativeness, belonging, familiar work atmosphere, joint leisure activities;
- Feminine archetypes: loyalty, flexibility, openness;
- Masculine archetypes: innovation, ambition (competitiveness, striving for success), competence (achievement orientation, smartness, ability, ingenuity), further education opportunities;
- Ambition: expressed through adjectives such as “high”, “enormous”, “best”, “great”;
- Competence: complex/visionary thinking, above average;
- Further education: images of growth and progress;
- Hedonism: variety, enjoyment.

The results of this study demonstrate the wide range of adjectives used in German OJVs and it would be very interesting to analyse a larger corpus of OJVs in order to detect patterns in their occurrence.

In some cases, soft skills such as “able to communicate”, “motivated”, and “capable of working in a team” have become empty phrases (Eggert 2015: 70). Other terms are often associated with employment levels or categories. Phrases such as “punctual” and “responsible” are often associated with blue-collar roles, while phrases about external appearance such as “clean-cut” or “professional-looking” are often associated with service and retail positions.

When recruiting for positions requiring a higher level of qualification, employers are more likely to use the services of personnel service providers. As the latter do not necessarily want to disclose the identity of their customers, the OJVs contain generic information. For example, the employer looking to recruit is described as successful, operating internationally and growing quickly (Immerschitt and Stumpf 2014: 132).

³⁰ The sample was composed of the DAX 30 companies as well as a selection public administrative bodies and SMEs.

Salary is more frequently included for occupations where there is a shortage of skilled labour (e.g. in the field of health and elder care) or for skilled tradesmen. For jobs requiring a high level of skills as well as for leadership positions, remuneration is subject to negotiation and consequently these OJVs do not contain such information (E6). In the construction sector, temporary work agencies do not publish information on the salary, since temporary pay is lower than regular contracts (E3). As salaries in public sector (e.g. administration, public hospitals) are determined by official pay scales, the pay grade is always mentioned in OJVs.

Finally, 70% of the German OJVs surveyed by Iwona Szwed (2017: 148) contained an invitation to apply, ranging from direct working such as, “Send us your online-application straight away” to more subtle wording like “We are looking forward to your application”. To attract the interest of potential candidates, constructions involving questions directed at the reader are often used (e.g. “What kind of tasks are awaiting you?” followed by a list of tasks) (Szwed 2017: 148).

6.4. Main Differences between the Public and Private Online Job-portals

While private job-portals give employers the option of uploading pdf-files or using portal templates, all OJVs on the Jobbörse follow the same format, as the Federal Employment Agency offers a standardised template that employers or PES advisers can fill out. This ensures that the matching functions on the Jobbörse can use these information fields to identify suitable job-seeker profiles.

Because the PES co-operates with private job-portals, some OJVs from these sources appear in its online job-portal. These OJVs are marked with a symbol signalling to the job-seeker that clicking on the OJV will re-direct the user to the external website of a private job-portal like Jobware, Yourfirm or Finest Jobs.

OJVs on the private online job-portals have more elaborate and detailed content than those on the PES portal. Blue collar occupations, which traditionally contain less information, are concentrated on the PES portal while specialist/managerial positions in white-collar occupations, comprising more detailed descriptions of the employer, work environment and benefits/perks, appear on private portals.

6.5. Expected Trends in the Format and Content of OJVs

Due to shortages of skilled labour, additional companies are likely to start using online job-portals as platforms for employer branding, and other competitor employers within their sector are expected to follow their lead (E6). Furthermore, more online portals and OJVs will need to be displayed on be adapted for smartphone screens. These developments will affects the format and content of OJVs as well as the channels for disseminating OJVs. Short videos demonstrating the work environment may become more popular and OJV length may be reduced, since job-seekers will not be interested in reading long texts (E8). Shortages of skilled labour are expected to give job-seekers the upper hand in the labour market. As a result, OJVs will likely contain more information on the benefits of working for the company and less formal requirements (E6). Additionally we predict that social networks will become more important in recruiting, as they enable direct contacts with potential candidates and give employers more insights into professional profiles and networks (E10).

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Expert Interviews

No.	Name of organisation	Type of organisation	Expert's position	Interview date
E1	VDMA	Sectoral association for machine engineering	Expert for securing skilled labour	28 February 2017
E2	Retail association HDE	Sectoral association for retail	Expert for education and VET	2 March 2017
E3	Company	Construction sector	HR expert	8 March 2017
E4	German Hospital Association	Health and elderly care sector	Expert for HR in hospitals	9 March 2017
E5	Job-portal observatory/network for the German OJV market	Personnel services	Co-ordinator of the web-site/network	21 March 2017
E6	Federal Employment Agency	PES	Expert from the employer service department	1 June 2017
E7	Federal Employment Agency	PES	IT expert	1 June 2017
E8	Large temporary work and staffing agency	Labour market intermediary	Practice Lead RPO	7 June 2017
E9	Online job-portal	OJV Portal	Managing director	13 July 2017
E10	Federal Statistical Office	Statistical Office	Labour market specialist	19 July 2017
E11	Consultancy	Personnel services	HR expert	2 March 2017

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EURES: <https://ec.europa.eu/eures/public/de/homepage>

Jobbörse: www.jobboerse.arbeitsagentur.de

Online-recruiting.NET: www.online-recruiting.net

Annexes

Annex 1: Ranked Sponsored Ads for Each Search Term

Ranking of sponsored ads	Search term 1: Job search	Search term 2: Job adverts	Search term 3: Job offers	Search term 4: Job-portal
	Resulting Portals	Resulting Portals	Resulting Portals	Resulting Portals
1.	Monster.de	Stepstone.de	Monster.de	Exper-teer.de/Jobsuche/Jobbörse
2.	De.Indeed.com	vrn-jobs.de	De.indeed.com	Yourfirm.de/jobboerse
3.	Stepstone.de		Stepstone.de	Jobworld.de
4.	Jobware.de		Jobware.de	Jobware.de
5.	Jobworld.de		Jometa.com	Autojob.de
6.	Yourfirm.de		Yourfirm.de/jobangebote	Sons-of-energie.de
7.	Stellenangebote.de		LinkedIn.com/premium/jobs	LinkedIn.com/premium/jobs
8.	Stiftungen.org/Stellenmarkt		Jobworld.de	Matchingbox.de
9.			Ferien-job.talk2move.de/	Monster.de
10.			Sons-of-energie.de/	Indeed.com
11.				Vrm-jobs.de
12.				Jobcluster.de

Source: IWAK.

Annex 2: Ranked Regular Ads for Each Search Term

Ranking of regular results	Search term 1: Job search	Search term 2: Job adverts	Search term 3: Job offers	Search term 4: Job-portal
	Resulting Portals	Resulting Portals	Resulting Portals	Resulting Portals
1.	Jobbörse – Federal Employment Agency	Jobanzeigen.de	Monster.de	Jobbörse.arbeitsagentur.de
2.	Stellenanzeigen.de	Ebay-kleinanzeigen.de/s-jobs/c102	Jobangebote.de	Xing.com/jobs
3.	Stepstone.de	Local24.de	Backinjob.de	make-it-in-germany.com/de/fuerfachkraefte/arbeiten/jobboerse
4.	Jobs.meinestadt.de	competitionline.com/de/jobs/anzeigen/suche	Jobs.meinestadt.de	Jobbörse.de
5.	de.indeed.com		Kimeta.de	Monster.de
6.	backinjob.de		Jobangebote Frankfurt University of Applied Sciences	Stepstone.de
7.	monster.de		mainova-karri-	Kimeta.de

			ere.de/jobs/jobangebot e.html	
8.	daimler.com		uni- goettin- gen.de/de/jobangebote /29718.html	Kalaydo.de/jobboerse
9.	manpower.de		studierendenjobs.de	Stellenanzeigen.de
10.	jobpilot.de		ferchau.com/de/de/karr iere/jobs- bewer- bung/jobangebote/sear ch/	Yourfirm.de/jobboerse
11.	de.dpdhl.jobs/jobsuche		sa- na.de/karriere/jobange bote.html?no_cache=1	https://www.laekh.de
12.	telekom.jobs/karriere		karri- ere.adac.de/jobangebo te	boersenver- ein.de/de/portal/Jobboe rse/158431
13.	randstad.de		spiel- station.de/jobangebote	douglas- karriere.de/jobboerse/
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28.	in- fineon.com/cms/de/car eers/jobsearch/jobsear ch/			
29.	make-it-in- germany.com/de/fuer- fachkraef- te/arbeiten/fuenf- schritte/jobsuche			
30.	stel- lensuche.karriere.spieg el.de			

Source: IWAK.

Annex 3: Specific Job-portals Explored for the Web-crawling³¹

a) General Job-portals, Which Contain OJVs Across Regions, Sectors and Positions/Career levels

Online job-portal	Number of OJVs	Stand
Jobbörse.com	2,500,000	03 January 2017
Kimeta.de	2,480,606	21 February 2017
CESAR	1,800,000	03 January 2017
Jobbörse.de	1,650,758	03 January 2017
Mitula.de	1,587,035	03 January 2017
PKO	1,493,335	12 March 2017

Source: Crosswater-Job-Guide.

b) Job-portals Specialising on Position/Career Level, Sector, Region

Position/career level	Online job-portal	Number of OJVs	Date
Internship	Karriere.de	392,370	08 January 2017
Students/internships	Jobsuma	238,261	04 January 2017
Specialists and managers	JobLeads	154,956	10 January 2017
Vocational education and training	Einstieg	107,128	15 April 2012
Graduates	Karrierestart.de	59,357	26 February 2017
Temporary work	German Personnel	51,471	30 January 2016

Source: Crosswater-Job-Guide.

Sector	Online job-portal	Number of OJVs	Date
Sales & Marketing	Absatzwirtschaft.de	381,251	04 January 2017
IT/engineers/freelancers	XING Projects	100,001	05 February 2016
Cars, automotive	jobs.automobilwoche.de	55,741	01 April 2016
Energy	cleantechjobs	52,720	06 February 2016
Hotel and catering	Jobsterne.de	47,544	07 March 2016

³¹ Source: http://www.crosswater-job-guide.com/jobboersen_verzeichnis_045_reichweite_alex/jboards_list.php?pagesize=-1

Source: Crosswater-Job-Guide.

Region	Job-portal	Number of OJVs	Date
Mecklenburg-Vorpommern	MV Job	199,486	18 January 2017
Oberpfalz	Onetz.de	96,174	18 January 2017
Berlin Brandenburg	Berliner-Jobmarkt.de	94,509	04 January 2017
Heilbronn	Jobstimmte/Heilbronner Stimme	58,160	30 August 2013
Regionale Jobs Mittelhessen Gießen Wetzlar Wetterau	Jobs-in-mittelhessen.de	40,429	03 February 2016

Source: Crosswater-Job-Guide.

c) Number of Visitors and Alexa Ranking

Job-portal	Monthly number of visitors	Alexa ranking
Stepstone	7,249,630	4,639
Arbeitsagentur	6,555,000	2,347
Indeed	5,483,500	162
Xing-Stellenmarkt	2,010,000	1,049
Kimeta	1,990,000	20,421
MeineStadt	1,600,000	3,332
Jobrapido	1,598,400	1,302
EURES European Jobs	1,489,600	860
Monster Germany	1,301,400	11,527
Stellenanzeigen.de	1,161,600	24,475

Source: Crosswater-Job-Guide.

Annex 4: List of Online Job-portals Identified as Relevant for the Web-Crawling

	Name of the job-portal	Website address	Rough position in the Google ranking	Type of job-portal
Portal 1	Monster	https://www.monster.de/	Business ad	Primary job-portal
Portal 2	Indeed	https://de.indeed.com/	Business ad	Secondary job-portal
Portal 3	Stepstone	https://www.stepstone.de/	Business ad	Primary job-portal
Portal 4	Jobware	https://www.jobware.de	Business ad	Primary job-portal
Portal 5	Jobworld	https://www.jobworld.de/	Business ad	Secondary job-portal
Portal 6	Yourfirm	https://www.yourfirm.de/	Business ad	Primary job-portal
Portal 7	Stellenangebote	https://www.stellenangebote.de/stellenangebote/?src=	Business ad	Primary job-portal
Portal 8	LinkedIn/jobs	https://www.linkedin.com/jobs/	Business ad	Primary job-portal
Portal 9	Jobcluster	https://www.jobcluster.de/	Business ad	Combination of primary job-portal and secondary functions
Portal 10	Bundesagentur für Arbeit- Jobbörse	http://jobboerse.arbeitsagentur.de/	first page	Primary job-portal
Portal 11	Stellenanzeigen.de	https://www.stellenanzeigen.de/stellenangebote/	first page	Primary job-portal
Portal 12	MeineStadt.de	http://jobs.meinestadt.de/	first page	Primary job-portal
Portal 13	Backinjob	http://www.backinjob.de/	first page	Combination of primary job-portal and secondary functions
Portal 14	Manpower	https://www.manpower.de/	first page	Combination of primary job-portal and secondary functions
Portal 15	Jobpilot	http://www.jobpilot.de/	first page	Secondary job-portal
Portal 16	Randstad	http://www.randstad.de/	second page	Primary job-portal
Portal 17	Jobs.zeit.de	http://jobs.zeit.de/	second page	Primary job-portal
Portal 18	Careerbuilder	http://www.careerbuilder.de	second page	Primary job-portal
Portal 19	Karrieresprung	http://www.karrieresprung.de	from third page on	Secondary job-portal
Portal 20	Hays	https://www.hays.de/	from third page on	Primary job-portal
Portal 21	Adecco	http://www.adecco.de/	from third page on	Primary job-portal
Portal 22	Jobanzeigen.de	https://www.jobanzeigen.de/	first page	Secondary job-portal
Portal 23	Ebay-Kleinanzeigen	https://www.ebay-kleinanzeigen.de/s-jobs/c102	first page	Primary job-portal
Portal 24	Lokal24	https://www.local24.de	first page	Primary job-portal
Portal 25	Jobangebote.de	http://www.jobangebote.de	first page	Secondary job-portal
Portal 26	Kimeta	http://www.kimeta.de	first page	Secondary job-portal
Portal 27	Xing.com/Jobs	https://www.xing.com/jobs	first page	Primary job-portal
Portal 28	Jobbörse.de	https://www.jobbörse.de	first page	Secondary job-portal
Portal 29	Kalaydo	http://www.kalaydo.de/	first page	Primary job-portal
Portal 30	Jobrapido	http://de.jobrapido.com		Secondary job-portal

Portal 31	EURES European jobs	https://ec.europa.eu/eures/public/de/homepage		Primary job-portal
Portal 32	Gigajobs	http://de.gigajob.com		Secondary job-portal
Portal 33	Quoka	https://www.quoka.de/		Primary job-portal
Portal 34	Jobs.de	http://www.jobs.de		Primary job-portal
Portal 35	Joblift	https://joblift.de		Secondary job-portal
Portal 36	Jobrobot	http://www.jobrobot.de/		Secondary job-portal
Portal 37	Adzuna.de	https://www.adzuna.de/		Secondary job-portal
Portal 38	Jobstairs	http://jobstairs.de/		Primary job-portal
Portal 39	Kununu Stellenmarkt	https://www.kununu.com/de/jobs/de		Primary job-portal
Portal 40	FOCUS ONLINE Kleinanzeigen Stellenangebote	http://kleinanzeige.focus.de/stellenangebote/		Secondary job-portal
Portal 41	Jobbörse.com	www.jobbörse.com		Primary job-portal
Portal 42	CESAR	http://www.cesar.de/		Secondary job-portal
Portal 43	Mitula.de	https://www.mitula.de/		Secondary job-portal
Portal 44	PKO-Jobjet	https://www.jobjet.de/		Combination of primary job-portal and secondary functions
Portal 45	jobs.automobilwoche.de	http://jobs.automobilwoche.de		Primary job-portal
Portal 47	Absatzwirtschaft.de	http://www.absatzwirtschaft.de/jobturbo/		Secondary job-portal

Source: IWAK.