Professionalisation in ERP Selection Revisited II

Stefan Humpl[1]

Abstract: The implementation of new ERP systems or the adaptation of existing ERP systems is a central challenge for modern companies, which is also reflected in the development of relevant job advertisements. A specific analysis of relevant job advertisements in Austria shows a professionalisation in ERP selection, but also a shift towards employing such experts in the own company versus outsourcing this expertise. Job titles and job specific requirements (competences) mentioned in job advertisements in 2017 and 2021 show a respective development. But it also becomes visible that the labour market for relevant experts is marked by a growing demand and insufficient supply, which implies that the more recent job advertisements are broader, more detailed in asking for competences, and therefore showing a hope for somehow fitting candidates.

Keywords: ERP selection, professionalisation, requirements.

1   Introduction

The implementation of new ERP systems or the adaptation of existing ERP systems through extensions, releases and supplementary products is a central challenge for modern companies [VH03]. This task is often outsourced to IT service providers, who are assumed to have a good overview of the various ERP providers, their range of services and functions and the possible interaction of different components. In some cases, however, this task is also solved internally within the company. The challenge for people with this task is that they can also oversee the further development of the ERP system and make further adjustments [Te00]. Is the internal demand increasing? Or is the demand for personnel in this area due to a growing market of IT service providers who support companies in ERP decision-making [Pa14]? And how are job titles, competences and tasks in the field of ERP decision-making developing ? How does the recent COVID crisis in the year 2020 influence the labour market for ERP decision makers? And finally, how is the ongoing positive labour market development in Austria influencing the demand for specific labour force in the field of ERP decision making?

This article likes to get to the bottom of this phenomenon by carrying out an analysis of job advertisements. These job advertisements include advertised positions in the area of ERP decision making / ERP implementation / ERP further development. For this purpose, online job advertisements from the period November 2016 to November 2019, from December 2019 to December 2020, and from December 2020 to December 2021 could be used, which were recorded in Jobfeed Austria - a product jointly developed by Textkernel and 3s. Jobfeed is a web crawler that captures and deduplicates online job advertisements

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[1] 3s Unternehmensberatung GmbH, Vienna, Austria, stefan.humpl@3s.co.at

from different platforms. Every year, jobfeed in Austria captures almost one million deduplicated job advertisements, so that it is assumed that Jobfeed represents about 95% of all Austrian online job advertisements.

2   Methodology

The concrete search for relevant advertised positions included the following search terms (as keywords in the full text of the advertisement):

- ERP selection

- ERP evaluation

- Requirements management

- ERP Analyst

- ERP Solution Architect

An explicit naming of software-specific keywords has been omitted because it was feared that there would be too much distortion in the direction of these keywords. Nevertheless, specific software packages (e.g. SAP, MS Dynamics) were mentioned several times in the advertisements.

This first search resulted in 13,852 job advertisements in total, or 4,715 deduplicated job advertisements. Deduplication is done automatically, but if a job advertisement is online longer than 8 weeks, it is counted again. From these 4,715 job advertisements a total number of 486 highly relevant job advertisements for the area of ERP decision making / ERP implementation / ERP further development were selected manually by reading through all job advertisements (tasks mentioned, competences required, job environments described). From these 486 highly relevant job advertisements the 100 "oldest" ones (from November 2016 to September 2017) were selected as well as the 100 "youngest" ones (from June 2019 to November 2019) to see differences in time. Results from this approach were published here last year [Hu20].

A revisited approach for 2020 to recent job advertisements found 1,715 deduplicated job advertisements (out of a total of 4,928 job advertisements) for mid-December 2019 to mid-December 2020 [Hu21]. For 2021 1,479 relevant job advertisements (deduplicated out of a total of 4,475 job advertisements) were identified.This article reflects the updated results of last years analysis under the light of the recent labour market developments in Austria in times of COVID crisis and the way out of the pandemie influenced labour market development.

3   Analysis

3.1   First overview – regional labour market, demand for highly qualified staff, demand via recruitment agencies

The keyword search in Jobfeed delivered a total of 4,715 deduplicated job advertisements for the aforementioned three-year period (total: 13,852 job advertisements with multiple entries) in a first search in late 2019.

A second job advertisement analysis covered the period from mid-December 2019 to mid-December 2020, and resulted in 4,928 total job-ads with multiple entries, or – deduplicated – 1,715 relevant job-ads. The recent COVID crisis in the Austrian labour market showed a significant drop in the share of recruitment agencies compared to the years 2017 to 2019. Recruiting of highly qualified staff was outsourced to a much higher share before the crisis, now external costs are the first ones to be cut, resulting in a higher share of internalisation of recruiting activities.

For 2021 a number of 1,479 deduplicated job advertisements (out of 4,475 in total) for the relevant bey words could be identified. This means a decreasing number of job advertisements defined through the above mentioned key words, but - as you will see later – an increasing number of relevant job advertisements for specific staff to carry out ERP selection within this sample. The regional share also shifted significantly to Upper Austria, followed by Vienna and Styria.

Province	Total 2017-2019	Regional share 2017-2019	Total 2020	Regional share 2020	Total 2021	Regionial share 2021
Upper Austria	640	13,57%	251	14,64%	414	27,99%
Vienna	1.975	41,89%	679	39,59%	309	20,89%
Lower Austria	494	10,48%	162	9,45%	195	13,18%
Styria	595	12,62%	198	11,55%	176	11,90%
Vorarlberg	252	5,34%	55	3,21%	116	7,84%
Tyrol	201	4,26%	87	5,07%	108	7,30%
Salzburg	359	7,61%	196	11,43%	98	6,63%
Carinthia	164	3,48%	64	3,73%	60	4,06%
Burgenland	35	0,74%	23	1,34%	3	0,20%
Total	4.715	100,00%	1.715	100,00%	1.479	100,00%

Tab. 1: Demand by federal provinces in Austria 2017 to 2019, 2020 and 2021
(Source: 3s based Jobfeed Analysis)

Even when the regional analysis in the previous table shows some shifts in the regional developments of ERP related job-advertisements, a closer look on some contents from these job-ads does show some developments. Firstly, the search for highly qualified staff seems to be intensified. In Vienna, where the demand for highly qualified staff was high in the previous years relevant growth was only little. But in all other Austrian countries the demand for highly qualified staff in 2020 was much higher than in the previous years. And secondly, the job demand of recruitment agencies (in comparison to direct job demand from companies) shows experienced a huge decrease, mainly due to much less external spendings from companies following the COVID-19-crisis. A recent analysis from the Austrian Institute of Economic Research shows a massively changed investment behaviour from Austrian companies – on the one hand more investment into IT and digitalisation, on the other hand focussing on internal investment rather than on external investment. [Hö20]
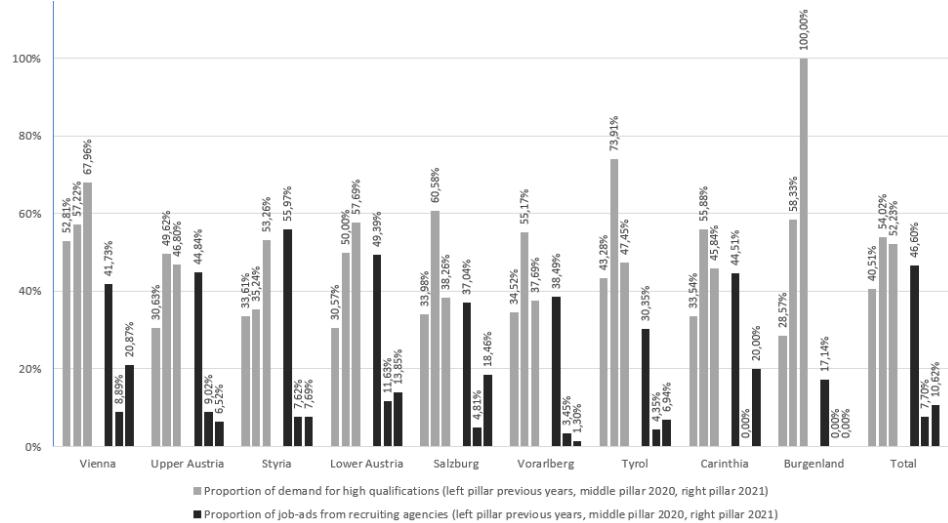

Fig. 1: Proportion of demand of highly qualified staff in ERP related job-ads and proportion of job-ads from recruiting agencies, 2017 to 2019, 2020 and 2021
(Source: 3s based on Jobfeed-Analysis)

3.2   Detailed definition, selection of samples for a comparison over periods

On closer inspection of all extracted advertisements, it quickly becomes clear that only a small proportion of them actually address the intended job market for experts in ERP decision making / ERP implementation / ERP further development. In many cases, ERP specialists are sought without wanting to change the ERP system. For this reason, a manual analysis of the advertisements was carried out, from which 485 job advertisements in the

first two years of analysis were finally selected that meet the specific requirements mentioned above. From these 485 job advertisements, in turn, two random samples were drawn upon:

- Sample 1: The chronologically oldest 100 matching job advertisements covering the period 25.11.2016 to 29.09.2017 (for the sake of simplicity, it is called "Advertisements 2017").

- Sample 2: The most recent 100 matching job advertisements covering the period 07.06.2019 to 20.11.2019 (for the sake of simplicity, it is called "Advertisements 2019").

So, while the first 100 matching advertisements still required 308 calendar days, the period for the last 100 matching advertisements was only 166 calendar days. This can be seen as an indication of a more intensive personnel search in 2019 compared to 2017. Samples taken for the years 2020 and 2021 focussed on the 100 most recent relevant job advertisements:

- Sample 3: Was taken between 29.07.2020 and 16.12.2020 ("Advertisements 2020"), which covers a period of 141 calendar days – another intensivation of search for relevant staff in 2020.

- Sample 4: Was taken between 14.10.2021 and 03.12.2021 ("Advertisements 2021"), which covers a period of 51 calendar days – a huge intensivation of search for relevant staff in 2021.

Although recruiting was internalised highly due to the recent COVID crisis in Austria, the need for highly qualified staff in ERP decision making is even higher than before. The COVID crisis resulted in a higher share of dislocated work, a specific challenge to IT systems and ERP systems especially.

3.3   Development of a professional job title or field of work?

The next step was to analyse the job titles used in the advertisements. As already mentioned, the female form was explicitly omitted in favour of simplicity of presentation. The following table shows a comparison of the terms used in 2017, 2019, 2020, and 2021. 2017 shows that there is a wider range of job titles used in the advertisements, e.g., business analyst, software developer, IT manager, or SAP consultant. The term consultant ERP systems has a comparatively low significance. Nevertheless, this latter term now seems to be gaining ground in the relevant job advertisements, because in 2019 the term consultant ERP systems will be the dominant job title in the relevant job advertisements, followed by business analyst, system administrator, IT manager, and analyst. The terms that have been summarized under "Unknown" are sometimes very flowery job titles of the companies themselves (e.g., "ERP Guru") or they are very general terms without any concrete connection to the job description (e.g., "employee" or "division manager"). In

2020 this stronger commitment to relevant job titles prolonged, with a high share of strictly ERP-related job titles (Consultant ERP Systems, Developer ERP Integration, ERP Manager, SAP Consultant as four of the top-5 nominations). This development took aIso place in 2021, even more focussed on job titles including the words "consultant", "manager", and "architect", showing more planning and decision making even within the job titles. However, the terms have not been manipulated personally.

	2017		2019		2020		2021
N	**Job Title**	**N**	**Job Title**	**N**	**Job Title**	**N**	**Job Title**
13	Business Analyst	20	Consultant ERP Systems	20	Consultant ERP Systems	11	SAP Consultant
11	Software Developer	12	Business Analyst	16	IT Manager	10	ERP Consultant
10	IT Manager	8	System Administrator	14	Developer ERP Integration	10	ERP Project Manager
5	SAP Consultant	6	IT Manager	10	ERP Manager	9	Solution Architect
5	Systems Engineer	5	Analyst	5	SAP Consultant	9	SAP Solution Architect
4	.Net Developer	5	Consultant	4	IT Project Manager	8	IT Manager
4	Consultant MS Dynamics	4	Business Administrator	4	Developer SAP	6	Business Analyst
4	BI Specialist Data Warehouse	3	IT Project Manager	3	IT Administrator	5	D365 Architect
4	Project Manager	3	SAP Consultant	3	Systems Engineer	4	ERP Architect

Tab. 2: In advertisements most frequently requested job titles in comparison 2017, 2019, and 2020 (Top 10, Source: 3s based on Jobfeed-Analysis)

3.4   Variety of business sectors with specific demand

In 2017, the demand sector was dominated by IT services, followed by industry. In 2019, the other sectors (trade, consulting, energy supply, general services, etc.) took the lead, followed by IT services and industry. 2020 showed again a lower share of IT services. Last years' statement of an indication of the internalisation of the task bundle ERP decision making / ERP implementation / ERP further development therefore can be underpinned with recent data (see figure 1). However, a certain amount of caution was mentioned in 2019 to be exercised in this evaluation, as there was a high number of unknown clients for advertisements due to the large number of advertisements placed by recruiters; in 2020 the number of advertisements placed by recruiters only play a minor role, and the share of IT services is again reduced. For 2021 the sector IT services again took the lead, the number of job advertisement placed by recruiters growing, but still
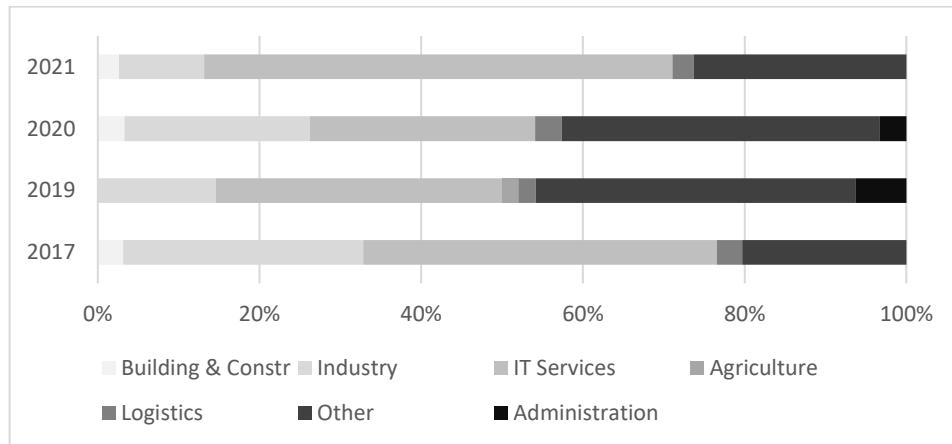
below the years 2017 and 2019.

Fig. 2: Demand sectors for ERP decision making job advertisments in 2017, 2019, 2020, and 2021
(Source: 3s based on Jobfeed-Analysis)

3.5   Demand for qualification levels

In comparison, the qualification level mentioned in the relevant advertisements shows that the demand in 2017 pointed even more decisively to university graduates. However, the demand pressure has increased in 2019, as indicated by the category "university or college[2]" in the demand for qualifications. In 2017, this still played virtually no role. An analysis of job advertisements in recent years clearly indicates that qualification requirements are expanded as demand pressure increases (this usually refers to an explicit shortage of skilled labour). In general, the relevant positions are mainly aimed at university graduates and to a lesser extent college graduates. College graduates, on the other hand, are mostly graduates from higher technical colleges. In 2020 also about two thirds of all relevant job advertisements are seeking for university and university OR college graduates (similar to 2019). But the lack of advertisements from recruiting agencies may result in an increase of need for lower qualification levels   (colleges, college / other, and other levels; see figure 2 in the apendix). The qualification level in demand is still reflecting highly qualified staff, but especially the Austrian specific vocational pathways play a role in the industry sector. For the year 2021 university degrees were demanded highest, showing a development towards high qualification levels for decision making positions in ERP.
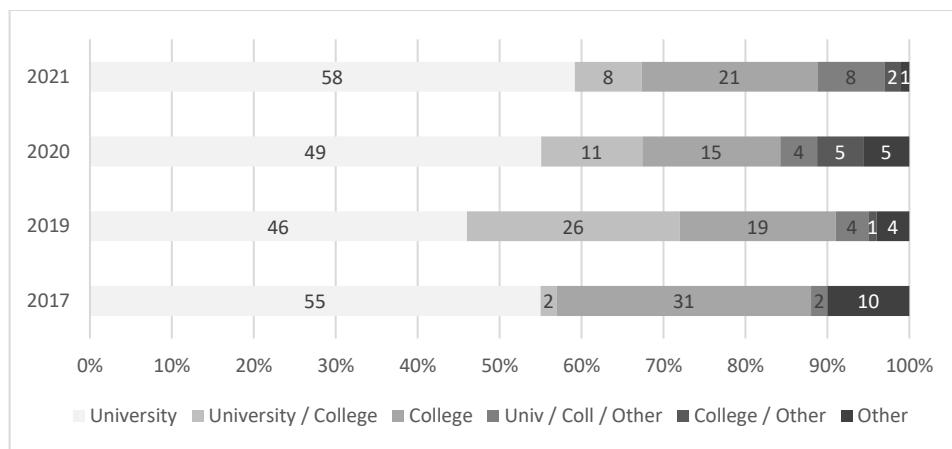
	University	University / College	College	Univ / Coll / Other	College / Other	Other
2021	58	8	21		8	21
2020	49	11	15	4	5	5
2019	46	26	19	4	1	4
2017	55	2	31		2	10

Fig. 3: Demand comparison of the highest completed training in 2017, 2019, 2020 and 2021
(Percentage; Source: 3s based on Jobfeed-Analysis)

3.6   Demand for competences

The following comparison shows the main competences and qualifications in demand, in relevant job advertisements. Whereas in 2017 relevant work experience was still top of the list, the increasing pressure of demand is also leading to a shift towards relevant training ("IT training" as a combined competence category). The advancement of the terms "ERP development and implementation" and "process management and process optimisation" seem to indicate a surge in professionalisation (analogous to the shift in occupational titles towards "consultant ERP systems").

Recent results from 2020 show that the competences demand seem to reflect the need for specific experience or specific qualifications. Even the expected demand for competences in specific ERP software areas seems to be higher in 2020 than in previous years. Maybe this also reflects the development of less recruiting agencies involved in the relevant recruitment processes, as they tend to look for broader competences in comparison. Competence demand in 2021 otherwise is more focussed on specific ERP experiences and programmes again, and by far less broad than in 2020. In an upheating labour market this might be a sign of higher demand for specialisation again. 2021 is a also a comeback-year for non-technical and non-process competences in demand, the term "Communication Skills", "Solution orientation", "Team skills" and others. Another interesting observation is the number of competences mentioned in relevant job advertisements: The number decreased from 2017 to 2020, but in 2021 the number of different competences and qualifications mentioned in job advertisements is higher than in the last years. This reflect again the upheating of the relevant labour market, as job advertisements need to be more specific and detailed to find relevant skilled labour force. The complete list of competence titles in the advertisements of 2017, 2019, 2020, and 2021 is shown in the appendix.

2017		2019		2020		2021	
N	**Competence**	**N**	**Competence**	**N**	**Competence**	**N**	**Competence**
43	Professional (ERP) experience	58	IT education	51	Professional (ERP) experience	55	IT education
40	IT education	38	Professional (ERP) experience	48	IT education	53	Professional (ERP) experience
32	Requirement analysis and management	36	ERP development and implementation	35	Business informatics	42	Business process management
31	IT project management	32	Process management and optimisation	31	Business administration education	37	Communication skills
29	ERP development and implementation	23	Requirement analysis and management	18	IT project management	28	Solution orientation
26	Business administration education	22	Business informatics	18	SAP and related systems	27	Team skills
23	Evaluation	21	User support, training	16	SQL and databases	26	Customer orientation
18	User support, training	21	IT project management	13	Business process management	20	SAP experience
17	Documentation / Business informatics / technical education	15	Evaluation	13	MS Dynamics (NAV / BC / D365)	19	Requirements analysis and management

Tab. 3: In advertisements most frequently requested technical and process-specific competences in comparison 2017 to 2021 (Top 10, Source: 3s based on Jobfeed-Analysis)
* 3 items with 17 frequences

4   Conclusion and a final analytical look at the income data

The activity profile ERP decision / ERP introduction / ERP further development seems to have become increasingly professional in Austria in recent years. This is indicated by both the job titles used in relevant advertisements and the concepts of competence. In general,

demand appears to have accelerated in recent years and the pressure on demand is likely to increase. Whether this development is driven by the economy can only be assumed in this context on the basis of the analysis of advertisements.

Looking at the income data contained in the advertisements, it must first be pointed out that these are difficult to capture analytically. The income details vary greatly, a minimum income is frequently mentioned, monthly income was standardised to an annual income with a factor of 14, and missing values (approx. 20%) were not taken into account. The income figures rose from 2017 to 2019 with an average value of EUR 46,931 to EUR 47,238, an increase of only 0.65%. These figures do of course not reflect the reality in income chances for relevant staff, as income possibilities in job-advertisements reflect two aspects: The legal necessity of stating a minimum income for the offered job on the one hand, and the strategic information from employers in job-ads as starting point for payment negotiations between employer and possible employees. Despite the obvious pressure on demand and the shortage of skilled workers, companies are still reluctant to disclose "real" earnings figures when recruiting staff.

In the light of the increasing demand for relevant staff in the still speeding up labour market job advertisements from 2020 show an increase of the average income possibilities up to EUR 49,951 (or plus 5,74% compared to 2019). For the job advertisements in 2021 the average income possibilities increase up to EUR 51,431 (or plus 2,96% compared to 2020). Again, this comparison shows a challenging labour market situation in the field of ERP decision making / ERP implementation / ERP further development in the recent COVID crisis influenced Austrian labour market. Challenging for recruiters, as still the recruitment process for qualified staff in this area is not an easy task, even as recruiting agencies can help less as external costs are reduced significantly. But it is also challenging for relevant staff seeking for jobs as their ability to fulfill the specific requirements may be difficult. Even as companies are reducing their demand for relevant experience, relevant qualifications and specific ERP competences, the individual demand shows a quite high differentiation.

In fact and unchanged to last years' final results, the analysis of job titles in job ads is quite tricky. Job titles and descriptions are created daily and often by marketing employees so that different job titles may have the same requirements for education and experience. So the analysis of job titles has to be done including the respective description of required competences. The combined analysis allows a careful statement as done in this article, but still leaves many questions open.

5   Future Work

The last years were quite challenging for the whole Austrian labour market. After some flourishing years with low unemployment rates, in June (at the peak of the COVID crisis), around 1,3 million Austrian workers were unemployed or in so-called short-work ("Kurzarbeit"), a specific funding programme to companies to pay between 80 to 90% of income for working hours reduced to a minimum of 10% (in the hope to reduce

unemployment). The situation at the labour market changed in 2021, although the pandemic was still influencing the labour market. But in December 2021, the number of unemployed persons in Austria was lower than in December 2019 (before the pandemic). And the labour market in specific skills needs sectors as IT was higher seen as "overheated" by some analysts.

In these challenging environment the labour market for ERP decision making / ERP implementation / ERP further development shows still a high demand from employers, even when the situation also for job-seekers is not always easy. The days to see 100 relevant job advertisements are less than in 2020 (141 calendar days compared to 166 in 2019, and compared to 308 in 2017). But the structure of the relevant demand has changed significantly in 2020: Recruiting agencies are involved to a massively lower rate than in 2019, reflecting the reduction of external costs due to the COVID crisis in Austria. Recent data shows that external recruiters come back into the labour market picture, but their specific role is still not easy do define. This is especially the case in the light of changing regional developments (Upper Austria taking the lead in the demand for ERP decision makers).

After articles in the last two years [Hu20] [Hu21] questioning the ongoing development, now we can state that the recruiting of relevant staff is internalised, and is focussing even more on relevant experience and qualifications and specific competences in ERP fields. The most relevant external effect is the need to provide dislocated work and dislocated connections to ERP to continue companies' development in times of crisis and so-called "lockdowns". Digitalisation therefore experienced a boost, which is also reflected in the job advertisement development, showing a quite different trend than most labour market sectors. Maybe this boost was necessary in the COVID crisis to help companies to survive, and we may see a reduced labour market demand in relevant fields in the next years, but this remains a hypothesis to be discussed in one or two years.

To get insight in the job market for ERP decision makers in the future, further analysis of job ads may be required using the same set of key words or a slightly changing set of key word as the wording in job ads may change also. Therefore, a direct comparison of different sets of job ads (dependent on the timing of the analyses) are to be made very carefully and with good understanding of job market changes in the field of ERP decision making – and even then observed changes have to be analysed carefully to exclude random results. The labour market experienced a massive change in 2020 and 2021 due to the COVID crisis, the observed results therefore may not show an ongoing trend, but the recent demands for companies' surviving in 2020.

A further specific topic for future analysis could be how the search for ERP decision makers is different between sectors, company size, and specific ERP systems in use (as their development as such also influences the search for ERP specialists). For a specific analysis in the coming year these questions should be touched if possible by the data source.

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7   Appendix

2017		2019		2020		2021	
N	Competence	N	Competence	N	Competence	N	Competence
43	Berufserfahrung, ERP-Erfahrung	58	IT-Ausbildung	51	Berufserfahrung, ERP-Erfahrung	55	IT-Ausbildung
40	IT-Ausbildung	38	Berufserfahrung, ERP-Erfahrung	48	IT-Ausbildung	53	Berufserfahrung, ERP-Erfahrung
32	Anforderungsanalyse und -management	36	ERP Entwicklung und Implementierung	35	Wirtschaftsinformatik	42	Prozess-management
31	IT-Projektsteuerung, IT-Projektmanagement	32	Prozessmanagement und Prozessoptimierung	31	Betriebswirtschaftliche Ausbildung	37	Kommunikation
29	ERP Entwicklung und Implementierung	23	Anforderungsanalyse und -management	18	IT-Projektsteuerung, IT-Projektmanagement	28	Lösungs-orientierung
26	Betriebswirtschaftliche Ausbildung	22	Wirtschaftsinformatik	18	SAP und damit verbundene Systeme	27	Teamfähigkeit
23	Evaluierung	21	Anwenderbetreuung, -schulung	16	SQL und Datenbanken	26	Kunden-orientierung
18	Anwenderbetreuung, -schulung	21	IT-Projektsteuerung, IT-Projektmanagement	13	Geschäftsprozessmanagement	20	SAP Erfahrung
17	Dokumentation	15	Evaluierung	13	MS Dynamics (NAV / BC / D365)	19	Anforderungs-analyse und -management
17	Technische Ausbildung allgemein	13	Kunden- und Partnerbetreuung	12	Objektorientierte Programmierung	16	Analytisches Denken
17	Wirtschaftsinformatik	13	MS Dynamics	10	MS Exchange, Windows Netzwerke	15	Cloud-Technologien
15	Prozessmanagement und Prozessoptimierung	12	Business Analyse	8	Anforderungsanalyse und -management	14	MS Dynamics 365
14	Business Analyse	11	Technische Ausbildung allgemein	8	ERP Entwickung und Implementierung	14	Selbständigkeit
13	Testkonzeption und Testung	9	Dokumentation	8	ABAP	13	Agile Project Management
12	Lieferantenmonitoring und -betreuung	8	Kostenkalkulation, Budgetplanung, Finanzierung	7	Java	12	Power BI
11	Teamführung	8	Qualitätssicherung	6	Cloud Services	12	S4/Hana
10	Reporting	7	Implementierung (roll-out)	5	Agile Entwicklung	12	SQL
9	Kunden- und Partnerbetreuung	7	Requirements Engineering	5	Prozessanalyse und -modellierung	11	Eigen-verantwortung
7	SAP	7	SAP	5	Budgetplanung, Finanzierung	10	Präsentations-fähigkeit
7	IT-Infrastruktur	7	Testung	4	ERP-Consulting	10	Technische Expertise
6	IT-Systemarchitektur	6	ERP-Consulting	4	ITIL	9	Azure
6	Budgetplanung, Finanzierung	6	IT-Systemarchitektur	3	Report Generator / Designer	9	Datenbanken

6	MS Dynamics	6	Logistik	3	Hardware / Embedded	9	Flexibilität
6	Software-Entwicklung	6	Teamführung	3	VMWare	9	Wirtschaftsstudium
6	2nd, 3rd level support von Applikationen	5	ERP Systemkenntnisse	3	Teamführung	8	Modellierung
5	Applikationsbetreuung	5	Integration verschiedener Systeme	3	Bewertung, Evaluierung	8	Technische Ausbildung
5	SQL / Datenbanken	5	Systemanalyse	3	IT-Infrastruktur	8	Wirtschaftsinformatik
5	System- und Releaseplanung	5	System- und Releaseplanung	2	BI Tools	7	Dokumentation
5	IT-Strategie	4	Applikationsbetreuung	2	Digitale Transformation	7	Java
5	Java	4	Beschaffung	2	IoT	7	Schnittstellen-mangement
5	MS .Net Framework	4	Compliance	2	Schnittstellenmanagement	6	API Management
4	ERP Transformation	4	Kommunikative Fertigkeiten	2	Sensorik-Basiswissen	6	Controlling
4	ERP Systemkenntnisse	4	Warenwirtschaft, Handel	2	Linux	6	MS Office
4	IT-Sicherheit	3	Cloud Technologie	2	Supply Chain Management	6	SAP
4	Kommunikative Fertigkeiten	3	Datenbanken	2	Logistik	6	Softwarearchitektur
4	Lastenheft	3	Engineering	2	App Entwicklung	6	Technisches Studium
4	Qualitätssicherung, Continuous Improvement	3	Lastenheft	2	Kubernetes	6	Wirtschaftliche Ausbildung
4	Systemanalyse	3	Produktionsprozesse	2	Infor LN	5	Finanzierung
3	Anwendungsprogrammierung	3	Reporting	2	Qualitätssicherung, Continuous Improvement	5	Navision
3	Führungserfahrung	3	Software Entwicklung	2	Best Practices	5	Organisation
3	Integration verschiedener Systeme	3	SQL	2	Support	5	Serviceorientierung
3	CRM	2	Anwendungsprogrammierung	2	Datenintensive Webanwendungen	5	Softwareentwicklung
3	Monitoring Plug-Ins	2	ERP-Typologie	2	HANA	5	Teamführung
3	Kundenworkshops	2	Führungserfahrung	2	Backend / Frontend Konzeption	5	Tests
3	Migrationsplanung	2	IT Audits	2	Container	4	ABAP
3	Document Management System	2	IT Systembetreuung	2	REST	4	Beratungskompetenz
2	Big Data Analysen	2	IT-Sicherheit	2	Mockup-Generierung	4	C#
2	Business Solutions	2	Rechnungswesen, Finanzen	2	Jira	4	Customizing
2	Datenbanken	2	Rs2	2	API Entwicklung	4	DevOps
2	Modellierung	2	Verhandlungen			4	Evaluierung
2	Warenwirtschaft, Handel					4	Fehleranalyse

2	Lifecycle Management				4	Logistikkenntnisse
2	Sharepoint				4	Oracle
2	ERP Support				4	Professionelles Auftreten
2	Objektorientierte Programmierung				4	Reporting
2	HTML				4	Scrum
2	CSS				3	ERP Implemen-tierung
2	Linus				3	Mitarbeiterschulung
2	Verkauf, Verhandlungsführung				3	Moderation
2	ERP Roll Out				3	Platform as a Service (SaaS)
2	C#				3	Programmiersprachen
2	Direct Marketing				3	REST APIs
2	Barcodesysteme				3	SharePoint

Tab. 4: In advertisements most frequently requested competences in comparison 2017 to 2020 (Source: 3s based on Jobfeed-Analysis)