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Data Descriptor

Overview of German Additive Manufacturing Companies

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Abstract: This dataset is the description of a curated list of companies involved in additive manufacturing in Germany. The companies included are of various categories, such as 3D printing providers, hardware manufacturers, software developers and vendors. The list was compiled through literature and Internet-based research, resulting in the compilation of information from a number of resources, such as the Bundesanzeiger (Federal Gazette), the Registergerichte (Register Courts), the respective websites themselves and a B2B marketplace (Wer liefert Was?). The aim of compiling this list is to provide information to researchers on the current situation of 3D printing in Germany.

Data Set: available as the supplementary files

Keywords: 3D printing; additive manufacturing; German companies; situation analysis

1. Introduction

3D printing and additive manufacturing (AM) are techniques and technologies to manufacture or create physical objects out of a number of materials such as plastics, metals or ceramics from digital model files generatively without requiring special tools besides a 3D printer. This technology is currently highly researched, and developments have been made by public institutions and private entities. Data on the prevalence of certain technologies in general or the market value in individual countries is sparse. This dataset is compiled to provide a basis for further research, such as market analysis and capitalization analysis, in Germany. The list contains information about 284 companies, ranging from individual persons, acting as legal entities, to internationally-active corporations. Information on such entities can also be used to incorporate external services in cloud manufacturing systems or connected 3D printing services, as described in Baumann et al. [1]. Furthermore, this information can be used to help to identify stakeholders in resource description endeavors as described in Baumann and Roller [2]. This dataset enables research on company structure and historical development in the domain of AM. Furthermore, with this dataset, collaboration initiation and the opportunity for industrial interested parties are facilitated. Functioning as a basis for extension, the dataset can also be used to assess the impact of this technology on the national economy of Germany.

This work is structured as follows: Following Sections 1 and 2 provides information on the method and sources used in this research for the data acquisition and compilation. Section 3 provides information on various sources used for the generation of this overview, on the motivation for the respective source selection and provides information on the scripts employed for automatic data acquisition in Section 3.2. Section 4 contains information on the dataset provided with this research as

supplemental data, and Section 4.1 provides detailed information on the structure of the overview document containing all of the information on the companies, excluding the downloaded html files.

2. Data Acquisition

The compilation was performed via literature (see Fastermann [3]) and Internet-based research for certain keywords and phrases. As sources for the Internet research, the search engines Google [4] and Bing [5] were utilized. The search phrases include, as well as combinations thereof:

- +"3D Druck" + Firma (engl.translation: 3D print + company)
- +"3D Drucker" + Firma (engl. translation: 3D printer + company)
- +"Additive Fertigung" + Unternehmen (engl. translation: additive manufacturing + company)
- +"Generative Fertigung" + Unternehmen (engl. translation: generative manufacturing + company)
- +"Rapid Manufacturing" + Unternehmen (engl. translation: rapid manufacturing + company)

The search phrases and keywords are presented here in their original German language, as the research is focused on Germany and the justification is that the companies sought address the German market in German. It was also argued that searching in this language will eliminate a large number of businesses that are out of scope, i.e., from other countries than Germany.

Furthermore, information was acquired indirectly via websites of federations or unions on AM-related topics.

For each company found, the respective website was visited, and the information of this site was extracted both manually and automatically, with the support of custom scripts (see Section 3.2). The German law dictates that every business operating in Germany and having a website must provide certain information in their imprint, such as the name, address and routing information. International companies with only German subsidiaries, such as Makerbot Deutschland, were not considered for this compilation. Furthermore, companies with only limited involvement in AM, such as Verbatim, who sells 3D printer filament, where apparent, were also excluded from consideration. Companies listed in association information, as described below, with apparent limited involvement in AM, such as companies offering photography services for 3D printing projects, were also excluded.

The list of excluded companies from the neighboring European and overseas American companies include:

- Makerbot Deutschland https://eu.makerbot.com, subsidiary of Stratasys GmbH/Stratasys Ltd. (USA)
- Stratasys Deutschland http://www.stratasys.com/de, subsidiary of Stratasys Ltd. (USA)
- 3D Jake https://www.3djake.de, niceshops GmbH from Austria
- PrintAbout GmbH http://printabout.de, distributor for PP3DP from The Netherlands
- 1zu1 Prototypen GmbH & Co KG https://www.1zu1prototypen.com, from Austria
- B&R Industrie-Elektronik GmbH http://www.br-automation.com, from Austria
- robotmech Stössl GmbH https://www.robotmech.com, from Austria
- 3d medical print KG http://www.3dmedicalprint.com, from Austria
- ENVISIONTEC GMBH https://envisiontec.com, subsidiary of ENVISIONTEC, INC. (USA)

These companies are either subsidiaries of foreign companies, operate in Germany from abroad or are located in neighboring countries and are of similar legal standing as German companies, e.g., a GmbH, Gesellschaft mit beschränkter Haftung, engl. company with limited liability.

Companies were further identified from the following associations, unions and exhibition websites:

- 3D-grenzenlos, 3D-Druck Magazin für Deutschland https://www.3d-grenzenlos.de/listen/3d-drucker-hersteller

- 3Dnatives, 3D Druck und 3D Drucker: Beste Preise, Tests, News http://www.3dnatives.com/de/deutschland-hersteller-270420161
- VDMA Verband Deutscher Maschinen- und Anlagenbau e.V. http://am.vdma.org/memberslist
- Hannover Messe http://www.hannovermesse.de/de/news/top-themen/additive-manufacturing
- ADDITIVE MANUFACTURING Forum https://additivemanufacturingforum.de/firmen
- digifab, Netzwerk Digitale Fabrik e.V. http://www.digifab-ev.de/seiten/vorjahre.htm
- M&T-Metallhandwerk http://www.mt-metallhandwerk.de/additive-fertigung-vom-prototyp-bis-zum-ersatzteil/150/44275
- Das 3D-Netzwerk http://www.3dnetzwerk.com/en/3d-network
- Verband 3DDruck e.V. http://www.verband3ddruck.berlin
- 3D-Druck Netzwerk Berlin http://3d-druck-netzwerk.de
- 3Printr.com https://www.3printr.com/serviceproviders

3. Results

For the compilation of the information on the companies, information from the following online sources was used. The relevance and information acquired is described after the list.

- Bundesanzeiger/Federal Gazette [6] https://www.bundesanzeiger.de
- Archive.org [7] http://web.archive.org
- Xing [8] https://www.xing.com
- Kununu [9] https://www.kununu.com
- Geocode [10] https://geocode.xyz
- Wer liefert was? [11] http://wlw.de
- Bing https://bing.com
- Handelsregister/Registry court [12] https://www.handelsregister.de

Information on the company was acquired primarily from the company website, which was identified by the means described herein. The Bundesanzeiger website was used to retrieve the latest balance sheets for the company where available. The latest balance sheets available were from the fiscal year 2015 for most companies. The information from Archive.org was used to assess the first and last archival dates for the website to estimate the popularity of the website (more popular websites are archived more often than less popular websites) and estimate the first appearance of the website on the Internet, which might coincide with the inception date of the company. Xing was used to acquire information on the company owner and might be used in later research to assess the company structure and employee qualification. Information from Kununu was used to assess a rating on the company from the viewpoint of its current and former employees and might be used in later research for qualitative dissemination. Geocode was used to map location information such as city to geo-information for display in digital maps; see Figure 1 for an example. The B2B marketplace Wer liefert was? (WLW) was used to provide additional information on the company such as inception date, categorization, description and contact information. Information on this website is provided by the company itself. The search engine Bing was used to provide information on the number of entries in the cache from the search engine with the motivation to assess the popularity of the website, with more popular websites having more entries in the search engine cache. Information from the registry courts was used to provide official information on the company address and status, as well as initiation documents, which are provided separately.

After probing fifteen randomly-selected companies from the dataset without a single result, it was deemed that the LEI (legal entity identifier) from the Legal Entity Register, https://www.leireg.de, is insufficient to provide meaningful information to the data in its current state.

Figure 1. Geographical distribution of identified companies; created with https://geocode.xyz/batch.

The list of all companies queried for and included in this study follows in Table 1:

Table 1. List of all additive manufacturing (AM) Companies in Germany included in this study.

#	Company Name	Company Website URL
1	prontotype e.K.	prontotype.de
2	ALL.RAPID 3D-Druck & Design	www.allrapid.de
3	RAYLASE AG	www.raylase.de
4	Membino GmbH	www.membino.de
5	Multec GmbH	www.multec.de
6	digitectum, marc bescher digitaltechnik	www.digitectum.de
7	Freeform4U GmbH	www.freeform4u.de
8	topmodellfabrik GmbH	www.topmodellfabrik.de
9	Fabrica GmbH	www.fabrica3d.de
10	alphacam GmbH	www.alphacam.de
11	tobaTEC GmbH & Co. KG	www.tobatec.net
12	Trindo Digitalmanufaktur GmbH	trin.do
13	Additive Elements GmbH	www.additive-elements.de
14	Rapidobject GmbH	www.rapidobject.com
15	Fabb-It UG	www.fabb-it.de
16	rw-3d Druckwerk GmbH	www.rw-3d.de
17	Speedpart GmbH	www.speedpart.de
18	3D Manufaktur Seevetal	www.3d-manufaktur-seevetal.com

Table 1. *Cont.*

#	Company Name	Company Website URL
19	CHH IT Solutions GmbH	www.3d-drucker-vertrieb.com
20	Konrad Rauh	www.3d-rauh.de
21	Kühling & Kühling GmbH	kuehlingkuehling.de
22	BigRep GmbH	bigrep.com
23	Construcion Zone GmbH Co. KG	construction-zone.de
24	electronic things GmbH	www.electronic-things.de
25	F & B rapid production GmbH	rapidproduction.org
26	German RepRap GmbH	www.germanreprap.com
27	NEXTDynamics Ldt.	next-dynamics.com
28	Copynet Innovationsgesellschaft mbH	www.copynet.de
29	WDS Software & Service GmbH	www.wds.de
30	voxeljet AG	www.voxeljet.com
31	ayxesis GmbH	ayxesis.de
32	PICCOś 3D World GmbH	www.piccos-3d-world.com
33	4D Concepts GmbH	www.4dconcepts.de
34	Lothar Galgenmüller	www.logatec-3d.de
35	Wenger & Krautwasser GbR	www.2printbeta.de
36	Apium Additive Technologies GmbH	apiumtec.com
37	ArcTron 3D Vermessungstechnik & Softwareentwicklungs GmbH	www.arctron.de
38	ABOUT 3D UG	www.about3d.de
39	encee CAD/CAM Systeme GmbH	encee.de
40	Sandhelden GmbH & Co. KG.	www.sandhelden.de
41	CADCOMMUNICATION. EK	www.cadplace.de
42	VisioTech GmbH	www.visiotech-gmbh.de
43	Printer Care Service GmbH	www.printer-care.de
44	KISTERS AG	www.projet-3d-drucker.de
45	Herz GmbH	shop.filamentonline.de
46	CINTEG AG	www.cinteg.de
47	Kevin Neugebauer	3ddruckkaufhaus.de
48	Stefan Reinsprecht—stebdesign	ddd-filament.com
49	filamentworld	www.filamentworld.de
50	metallpulver24	www.metallpulver24.de
51	Materials Consulting Dr.-Ing. Beate Heisterkamp	www.dr-heisterkamp.de
52	Rolf Lenk Werkzeug- und Maschinenbau GmbH	www.rolf-lenk.de
53	Fr. Aussieker Metallverarbeitung GmbH & Co. KG	www.fr-aussieker.de
54	CAST SOLUT Sales and Service GmbH	vioproto.de
55	C.F.K. CNC-Fertigungstechnik Kriftel GmbH	www.cfk-online.de
56	bkl-lasertechnik	www.bkl-lasertechnik.de
57	TLS Technik GmbH & Co Spezialpulver KG	www.tls-technik.de
58	ENGINEERING FOR YOU GmbH	www.engineering-for-you.com
59	PyroPowders.de	www.pyropowders.de

Table 1. *Cont.*

#	Company Name	Company Website URL
60	Reinhold Bürosysteme GmbH	www.reinhold-kopiersysteme.de
61	3D-Laserdruck GbR	www.3d-laserdruck.de
62	Lapro GmbH	www.druckt3d.de
63	Material 4 Print GmbH & Co. KG	www.material4print.de
64	Office- und Kopiermanagement 2000 Schramm & Städtl OHG	www.3d-drucker-bayreuth.de
65	MediaCom-IT Distribution GmbH	www.mediacom-it.de
66	BERNHARDT Kunststoffverarbeitungs GmbH	3dk.berlin
67	DAS FILAMENT	www.dasfilament.de
68	Prototec GmbH & Co. KG	www.prototec.de
69	MBFZ toolcraft GmbH	www.toolcraft.de
70	Hawener 3D GmbH	www.hawener.de
71	Mark3d GmbH	www.mark3d.de
72	pro3D GmbH & Co. KG	www.pro3d.website
73	Solling-CAD	solling-cad.de
74	ReaLizer GmbH	www.realizer.com
75	CRDREI GmbH	www.crdrei.de
76	fabtory	fabtory.de
77	CP—Centrum für Prototypenbau GmbH	cp-gmbh.de
78	Makerlounge 3D-Studio	makerlounge.com
79	simufact engineering gmbh	www.simufact.de
80	Kevin Neugebauer	www.myprintoo.de
81	iGo3D GmbH	www.igo3d.com
82	rioprinto UG	www.rioprinto.com
83	3DXXL	www.3dxxl.net
84	Napoli-Design	www.napoli-design.com
85	marhellabs	www.marhellabs.com
86	ArchiKonstrukt	www.3d-druck-dienst.de
87	Project 3D GmbH	project3d.net
88	Roman Hölz	www.creativ3dprint.de
89	3D4real 3D Druck	www.3d4real.net
90	XTRUDR UG (haftungsbeschränkt)	www.xtrudr.de
91	Marin Mihatov	printit-3d.de
92	MüSys 3D Druck	muesys-3d-druck.de
93	Jens Hevike	mannheim-3d-druck.de
94	3D Activation GmbH	www.3d-activation.de
95	ProTec3D	www.protec3d.de
96	Riesen Consulting	riesen-consulting.de
97	MakeBox	makebox.de
98	On wire e-business GmbH	www.fabbermania.de
99	Andreas Einsiedel und Philipp Hofmann GbR	www.3dzentrum.de
100	CUBER 3D-Drucker	www.cuber3d.de
101	3D-Printwerk	www.3dprintwerk.de
102	3D4you 3D-Druck Service Matthias Lasch	www.3d4you.de
103	Pryo3D	www.pryo3d.com

Table 1. *Cont.*

#	Company Name	Company Website URL
104	contura Modellbau Friedje Feldt	www.contura-modellbau.de
105	TrigonArt—Bauer & Praus GbR	www.objectplot.de
106	YOUin3D.com GmbH	www.youin3d.com
107	ULFTELLER 3D-Druck	schnelle-modelle.com
108	3D Druck-Coburg GmbH	www.3d-druck-coburg.de
109	Christian Etzold und Stefan Seifert GbR	www.third-layer.com
110	3Faktur GmbH	3faktur.com
111	TMV Anlagenbau GmbH	3d-druck-dresden.de
112	IFA3D Medical Solutions GmbH	www.ifa3d.com
113	Kramper 3D—Druck Design	kramper-3d.de
114	Malte Fürstenberg & Ansgar Heuser GbR	richtig-druck.de
115	grubster GmbH	www.grubster.de
116	CEV 3D Druck	cev-3d-druck.de
117	URBANMAKER UG	www.urbanmaker.de
118	rw-3d Druckwerk GmbH	www.rw-3d.de
119	3D GENERATION GmbH	www.3dgeneration.com
120	3D Make me small	www.3dmakemesmall.de
121	Effectiv 3D Druck GmbH	effektiv-3d-druck.de
122	Eberle Printing	3d-drucken-lassen.com
123	3D-Druck Service	www.touch-the-bits.de
124	ZmartPart GmbH	www.zmartpart.de
125	3D CONTECH GmbH & Co. KG	3dcontech.com
126	CNC-Technik MACK GmbH & Co. KG	www.cnc-mack.de
127	Modell- und Formenbau Blasius Gerg GmbH	www.gerg.de
128	ifp—Prof. Dr.-Ing. Joachim Milberg Institut für Produktion und Logistik GmbH & Co. KG	www.ifpconsulting.de
129	Kegelmann Technik GmbH	www.ktechnik.de
130	Smart Media Products UG	www.toolhubs.com
131	3D Manufaktur	www.3ddm.eu
132	Dooblex GmbH	www.dooblex.de
133	Reiser AG Maschinenbau	www.reiser.ag
134	MFD—Kunststofftech GmbH	www.mfd-gmbh.de
135	M3DP UG	www.m3dp.de
136	Mack Technik GbR	www.mack-technik.com
137	FKM Sintertechnik GmbH	fkm-lasersintering.de
138	W.Hafner GmbH & Co.KG	hafner-gmbh.com
139	Web TV Berater GmbH	dddprintservice.de
140	Litechnology	litechnology.de
141	Techno-Grafica GmbH	techno-grafica.de
142	Ingenieurbüro Hampe GmbH	www.ingenieurbuero-hampe.de
143	CADITS GmbH	www.3d-printparts.de
144	3YOURMIND GmbH	www.3yourmind.com
145	Proto Labs GmbH	www.protolabs.de
146	Creabis GmbH	creabis.de
147	Your own Products—YoP	yop3d.de

Table 1. *Cont.*

#	Company Name	Company Website URL
148	MPS Rapid Prototyping GmbH	www.mps-prototypen.de
149	PrivatePrints3D	www.privateprints3d.com
150	3D Fabrik Oliver Wesch	www.3d-fabrik.eu
151	Formicum 3D-Service GmbH	www.formicum.de
152	3D-Picture.net	3d-picture.net
153	cirp GmbH	cirp.de
154	REKON 3D GmbH	www.rekon3d.de
155	Holocreators UG	holocreators.com
156	EUGENIO	eugenio3d.com
157	JELL GmbH & Co. KG	www.jell-werkzeugelemente.de
158	Reil und Gillert GbR	www.druckwege.com
159	TIME TOOL Rapid Prototyping	www.timetool-technology.de
160	DICK & DICK Laserschneid- und Systemtechnik GmbH	www.dick-dick.de
161	iPUNKT engineering & design UG	www.ipunkt-engineering.de
162	3D für Alle	3dfüralle.de
163	Blue Production GmbH	www.blue-production.de
164	WDV GmbH	www.wdv-services.de
165	vividesign 3D	vividesign.de
166	CAD Construction	cadconstruction.de
167	NordWest GmbH	www.3dokuteam.de
168	Formfab	www.formfab.de
169	IMT Systeme und Services GmbH	www.imt-lasersintern.de
170	MS-Creare GbR	www.ms-creare.com
171	SCHMOLZ + BICKENBACH GUSS GmbH	3d.sbguss.de
172	tbko Thomas Bengel Konstruktion + Prototypen	tbko.de
173	topmodellfabrik GmbH	www.topmodellfabrik.de
174	WEIHBRECHT Lasertechnik GmbH	www.weihbrecht.de
175	Art Shapes GmbH	www.artshapes.de
176	3D Fab	www.3dfab.net
177	Elektrotechnik Röck	www.elektrotechnik-roeck.de
178	3D4you 3D-Druck Service Matthias Lasch	www.3d4you.de
179	FREEFORMA AM GmbH	www.freeforma.am
180	voxelwerk GmbH	www.voxelwerk.de
181	ScanyME GmbH	www.3d-colorprint.de
182	FORMRISE GmbH	formrise.com
183	Fasterpoly GmbH	www.fasterpoly.de
184	Vokal + Partner	vokal.de
185	H & H Gesellschaft für Engineering und Prototypenbau mbH	www.huh.de
186	Renishaw GmbH	www.lbc-engineering.de
187	ideas2touch	www.ideas2touch.com
188	CADSPEED GmbH	www.cad-speed.de
189	Rosswag GmbH	www.rosswag-engineering.de
190	kA4 > Crew < Video- und Multimediaproduktion	www.figur3d.de

Table 1. *Cont.*

#	Company Name	Company Website URL
191	Q-4 GmbH	www.3ddinge.de
192	TinkerToys GmbH	www.3ddrucken24.de
193	Find-a-Fab	www.findafab.com
194	3D Schilling GmbH	3d-schilling.de
195	scope for design GmbH	www.scopefordesign.de
196	*Plottwerk	www.plottwerk.com
197	Kuhn Stoff GmbH & Co. KG	www.kuhn-stoff.de
198	MMM Medizinische Modellbau Manufaktur GmbH	myhumanx.com
199	Trautter Modell & Guss GmbH & Co. KG	modellbau-trautter.de
200	delbramed e.K.	www.delbramed.de
201	optiplan GmbH	datenunddruck.de
202	3D-TEC e.K.	www.3dtec-ek.de
203	Stone, Bludins & Ochsendorf Prototyping GbR	www.sbo-prototyping.de
204	3D Module GmbH	3d-module.de
205	saarpri.com	www.saarpri.com
206	Altair Engineering GmbH	www.altair.de
207	HAMUEL Maschinenbau GmbH & Co. KG	www.hamuel.de
208	ARBURG GmbH + Co. KG	www.arburg.com
209	FIT AG	fit.technology
210	AMR UG	www.amresearch.de
211	citim GmbH	www.citim.de
212	Uwe Brick	www.burms.de
213	Additive Works GmbH	additive.works
214	Hasenauer & Hesser GmbH	www.hasenauer-hesser.de
215	Hermle Maschinenbau GmbH	www.hermle-generativ-fertigen.de
216	JOMATIK GmbH	jomatik.de
217	LIGHTWAY GmbH & Co. KG	lightway-3d.de
218	LMD GmbH & Co. KG aA	www.lmd-innovation.de
219	Murtfeldt Kunststoffe GmbH & Co. KG	www.murtfeldt.de
220	DREIGEIST GbR	www.dreigeist.com
221	O.R. Lasertechnologie GmbH	www.or-laser.com
222	NANOVAL GmbH & Co. KG	www.nanoval.de
223	Proto Labs GmbH	www.protolabs.de
224	RILE Management und Vertriebs GmbH	www.rile-group.com
225	Schneider International Holding GmbH	www.si-smart.net
226	H.C. Starck GmbH	www.hcstarck.com
227	trinckle 3D GmbH	www.trinckle.com
228	PROTIQ GmbH	www.protiq.com
229	Schunk GmbH	www.schunk-carbontechnology.com
230	Krause DiMaTec GmbH	www.krause-dimatec.de
231	CAE Innovative Engineering GmbH	www.produktentwicklung.de
232	RUHRSOURCE GmbH	www.ruhrsource.com
233	enders Ingenieure GmbH	enders-ing.de
234	PONTIALIS GmbH & Co. KG	www.3dmensionals.de

Table 1. *Cont.*

#	Company Name	Company Website URL
235	Uwe Könneker	3d-solution-store.de
236	3D-LABS GmbH	3d-labs.de
237	medacom GmbH	www.medacom.de
238	Nanoscribe GmbH	www.nanoscribe.de
239	NanoScale Systems, Nanoss GmbH	nanoss.de
240	TETRA Gesellschaft für Sensorik, Robotik und Automation mbH	www.tetra-ilmenau.de
241	Print2Taste GmbH	www.Print2Taste.de
242	BioInspiration GbR	bioinspiration.eu
243	Concept Laser GmbH	www.concept-laser.de
244	TRUMPF GmbH + Co. KG	www.trumpf.com
245	3D MicroPrint GmbH	3dmicroprint.com
246	rapid product manufacturing GmbH	www.rpm-factories.de
247	PTZ-Prototypenzentrum GmbH	www.ptz-prototypen.de
248	PTS Jena GmbH	www.pts-jena.de
249	Präzisionsmodellbau Rudolf Heinrich	www.praezisionsmodellbau-heinrich.de
250	prokon Engineering & Services GmbH	www.prokon.de
251	PORTEC GmbH	www.portec-gmbh.de
252	Stefan Pfaff—Werkzeug- und Formenbau GmbH & Co. KG	www.pfaff-mold.de
253	nobitec Prototypen-Service GmbH	www.nobitec.de
254	ModellTechnik Rapid Prototyping GmbH	www.modelltechnik.de
255	Wehl & Partner Muster und Prototypen GmbH	www.wehl-partner.de
256	Triyaz UG	www.triyaz.com
257	StaeGi GmbH	www.staegi.de
258	TEUFEL Prototypen GmbH	www.teufel-prototypen.de
259	Schübel GmbH primeparts	www.primeparts.de
260	RPT Rapid Prototyping Technologie GmbH	www.rpt.de
261	Hering & Schneider GmbH	www.hering-schneider.de
262	Hördler rapid engineering	www.hoerdler.de
263	Leotech Rapid Prototyping und Werkzeugbau GmbH	www.leotech.de
264	Josef Gördes oHG	www.modellbau-goerdes.de
265	MegaPrototyping GmbH & Co. KG	www.megaprototypen.de
266	LZN Laser Zentrum Nord GmbH	www.lzn-hamburg.de
267	LaserTeck GmbH	laserteck.de
268	LAC Laser Add Center GmbH	www.laser-add-center.de
269	KHP-Prototyping	khp-prototyping.de
270	KerCon GmbH & Co. KG	www.kercon.eu
271	Robert Hofmann GmbH	www.hofmann-innovation.com
272	FUNK MASCHINENBAU	www.funk-maschinenbau.de
273	GRATZ Engineering GmbH	www.gratz.de
274	FKT Formenbau und Kunststofftechnik GmbH	www.fkttriptis.de
275	INDIA-DREUSICKE Berlin	www.freeformer.berlin
276	CIPRES Technology Systems	www.cipres.de

Table 1. *Cont.*

#	Company Name	Company Website URL
277	canto Ing. GmbH	prototypen.de
278	Bionic Production GmbH	bionicproduction.com
279	Bartz & Schalk GmbH	www.bartz-schalk.de
280	apppex Product Development Prototypes Parts GmbH	www.apppex.com
281	3D-Metall Theobald e.K.	www.3d-metall-theobald.de
282	igus GmbH	www.igus.de
283	3D-PrintShop	www.3d-printshop.biz
284	Hot-World GmbH & Co. KG	repetier.com

3.1. Classification

The companies contained in the overview are first categorised into two categories describing the perceived orientation towards 3D printing. The first category is partial (**PART**, in the overview document) for companies that are involved in 3D printing, but also cater to some other forms of business, e.g., selling other kinds of machinery or providing other services than 3D printing. The second category is complete (**COMPLETE**, in the overview document), denoting businesses that are solely focused on 3D printing.

Further categorization is performed on the mode of business, with:

- Sale or production of hardware, i.e., 3D printers (indicated as **HW(P)**, in the overview document)
- Sale or development of software, e.g., 3D printing simulation or other tools (indicated as **SW**, in the overview document)
- Sale of supplementary material for 3D printers, e.g., filament, powder, or resin (indicated as **HW(MAT)**, in the overview document); also development of 3D printing material
- 3D printing service and other services, such as 3D printer rental, 3D model preparation or training (indicated as **SERVICE**, in the overview document)

3.2. Script-Based Information Retrieval

To facilitate efficient data acquisition and enrichment, a number of scripts were employed. The scripts are written in BASH [13] for the Linux platform. These scripts are detailed in the following Sections 3.2.1–3.2.7.

3.2.1. Registry Court Information

See Supplementary Material **reg-ger-search.sh** for the script that was used to acquire data from the central registry court information website. This script scrapes the website for the search term that is the company's name and then downloads all associated publications and information for the respective company. A number of publications, such as historical records, must be purchased from the registry court website, and these publications are excluded from the download. The results were manually checked to eliminate false-positive results for companies with similar names.

3.2.2. Information from B2B Marketplace WLW

The script **wlw-search.sh** scrapes the B2B-marketplace Wer liefert was? (WLW) for information on the company in question. The script utilizes the central search function of the website and acquires the details present for the first company by the searched for name. Furthermore, this script extracts the html title of the associated company website to provide an automated way of capturing this

information. The WLW website contains information provided by the businesses themselves. On this website, all registered companies are identified by an integer identifier.

3.2.3. Information on the Results from the Search Engine Bing

With the script **bing-info.sh**, information on the number of results in the search engine Bing's cache is extracted, as well as information on how often the company URL is linked on other websites.

3.2.4. Information from the Internet Archive

The script **archive-info.sh** parses the information from the Internet Archive at https://www.archive.org for a specific URL, the company URL. Information is extracted on the first and last occurrence of the archival process, with the motivation that popular websites are being archived more often and, furthermore, to provide information on a possible company inception date. Information on the number of archival requests is also retrieved.

3.2.5. Wordcloud Generation from Website Data

The script **website2wordcloud.sh** extracts all visible and invisible links from the company website's base URL and downloads every document linked to a temporary folder. From the downloaded files, only files that are html are further analyzed. The resulting files are parsed from html to text and aggregated in one single file for wordcloud processing. The wordcloud processing is performed with the software word_cloud [14] from https://github.com/amueller/word_cloud, and the most common words are placed on a digital canvas according to their occurrence and scaled accordingly. For further processing, the aggregated text file is separated into words and stored separately. An example for such a wordcloud is presented in Figure 2 from the company **StaeGi GmbH** with the URL http://www.staegi.de. A number of websites was not suitable for automatic parsing and acquisition due to heavy reliance on JavaScript, Flash or other technology that is not readily accessible with text-based tools. These websites are unfriendly to screen readers and other assistive technology and were excluded from further automated analysis.

Figure 2. Example Wordcloud for StaeGi GmbH.

3.2.6. Most Common Words on Website

The script **most-common-words.sh** analyzes the aggregated textual website data generated by the **website2wordcloud.sh** script for the ten most used words. The words are compared against a list

of stop words (see Appendix A A1 Stop Word List), which are excluded from further consideration. The script produced a list of these common words, separated by commas, and each word prefixed with the number of occurrences. Furthermore, the script presents the total number of words (including the words contained on the stop word list) in the analyzed text file.

3.2.7. Overview Document

The script **company-info-aggregate.sh** was used to aggregate all information, both manually and automatically acquired, on the respective company and parse this information into a CSV (comma-separated value) file. The resulting overview file contains information on each of the companies identified, with information from the B2B-marketplace WLW, the registry court general information, the Internet Archive, the search engine Bing, geo-coded information on company location and information on the most common words from the company website, as described in Section 4.1. The geo-coded information is primarily based on the official address registered with the registry court and retrieved for the complete address, i.e., street name, number, zip code and city. As a compensation strategy, the address available on the respective website was used for the retrieval of the geo-coded information.

4. Dataset

The dataset presented in this work is composed of the following:

- Documents from the registry court in supplemental data file **reg_court.zip**, with the files sorted into directories. Every directory is named after the md5 hash of the company name, present in Column 1 of the overview document. Files in each directory with the suffix "_vo_pub_X.htm" and "_vo_pub_X.txt" contain publications from the registry court where X is a number starting from zero; all publications available on the registry court website are presented in ascending order. The file with the ending txt is derived from the html version by parsing the information and is the textual representation. Files with the suffix "_ut.htm" contain the registry court information on the company, such as the official name and legal status.
- Documents containing the latest balance sheets from the official Federal Gazette in **ba.zip**, with html documents for each company available. The files are named "BA_NUMBER_NAME_YEAR.htm", where NUMBER is identical to the number in Column 2 of the overview document. NAME is an abbreviated name of the company, and YEAR identifies the year of the balance sheet. This information was acquired manually, as the Federal Gazette website uses captchas, which could not be circumvented.
- Overview document as described in Section 4.1 as an Excel document. Automatically acquired data were manually checked for coherency and manually adapted where necessary.
- Website information and complete, textual, websites for the respective company in file **web.zip**, with the individual files named "URL_accumulated.txt", where URL is identical to the company's URL.
- Wordclouds for each respective company in the file **wordclouds.zip** with files named URL_wordcloud.png, where URL is the company's URL with the prefix http:// or https:// removed.

A complete wordcloud of every downloaded website is depicted in Figure 3.

Figure 3. Wordcloud on all downloaded and aggregated websites.

4.1. Structure of Data

The following list explains the data structure that is present in the company list. One example each, description or name, is provided for every column, starting from the first:

1. Cryptographic hash (md5) of the company name: "a6f2c37b03eb17751bdb1f03f4df581a"
2. Company number in list: "1"
3. Website title acquired from the respective website: "prontotype: 3D-Druck I 3D-Modeling I Rapid Prototyping I Hamburg"
4. URL of company website: "http://prontotype.de/"
5. Company name as presented on the company website: "prontotype e.K."
6. Owner or chief executive of the company with the gender present in brackets: "Marc Zimmerer(m)"
7. Zip code and city of the company as presented on the company website: "22525 Hamburg"
8. Register court number: "HRA 116517"
9. VAT Id: "DE 295817576"
10. URL of Xing [8] profile of each executive, separated by comma; Order is identical to the ordering of the persons 5 columns prior with missing profiles identified by N/A: "https://www.xing.com/profile/Marc_Zimmerer"
11. URL of Kununu [9] of company: "https://www.kununu.com/de/trindo"
12. Kununu rating of the company where present: "3.82"
13. Indication if company is completely or partially focused on 3D printing: "COMPLETE"
14. Indication/classification on business area of company: "HW(MAT),SW"
15. Number of results from Bing search engine for the company URL: "51"
16. Number of results from Bing search engine for documents from the company's domain: "43"
17. Date of the first entry for an archived version of the website in archive.org: "2014-Mar-09 19:31:07"
18. Date of the last entry for an archived version of the website in archive.org: "2017-Jan-10 13:22:02"
19. Number of archived versions of the website in archive.org: 27
20. Company name from WLW marketplace: "prontotype e.K."
21. URL of company from WLW marketplace: "http://www.prontotype.de"
22. Zip code and city of company from WLW marketplace: "22525 Hamburg"
23. WLW internal ID for company: "1744235"

24. URL of company in WLW marketplace: “https://www.wlw.de/de/firma/prontotype-ek-1744235”
25. Number of employees from WLW marketplace: “1–4”
26. Contact email from WLW marketplace: “mail@prontotype.de”
27. Name of executive from WLW marketplace, gender present in brackets: “Malte Fuchs(m)”
28. Inception year according to WLW marketplace: “2011”
29. Company description present in WLW marketplace: “3D Druck und Rapid Prototyping Service. Wir erstellen 3D Modelle für Modellbau, Architektur, Bildung, Medizin, Kunst und Unterhaltung.”
30. Categories listed for the company in WLW marketplace, separated by comma: “3-D Druck, Rapid Prototyping”
31. Title of the website, extracted automatically: textbfprontotype: 3D-Druck
32. Register court for the company: “Amtsgericht Hamburg HRA 116517”
33. Legal form of company according to the register court: “Einzelkaufmann”
34. Initial capital entered into the company per information from the register court, value with denomination: “27000 EUR”
35. Date of entry into the registry court: “2013-10-30”
36. Date of deletion from the registry court, not present for active companies: “2014-10-30”
37. Company balance sheet from the registry court, data field is present in information from the registry court but none of the queried companies has any value set: “N/A”
38. Official name and address of company from the register court: “prontotype e.K., Kleine Bahnstr. 6, 22525 Hamburg”
39. Geo-coded city name of company: “Hamburg”
40. Geo-coded country name of company: “DE”
41. Latitude of company address: “53.56451”
42. Longitude of company address: “10.00739”
43. Confidence value for geo mapping of company address: “0.9”
44. Number of words found on website by web scraping: “1247”
45. And the following 10 columns contain the ten most common words from the website with the number of occurrences concatenated with the respective word: “41:prontotype”

5. Conclusions

The information presented in this study is intended to enable further research in the structure, distribution and nature of companies working in the area of AM in Germany. The companies in this dataset are of various natures and range from small, one-person companies to large corporations with a diverse business focus, ranging from hardware, to software, to 3D printing services.

Supplementary Materials: The following items are available online at www.mdpi.com/2306-5729/2/3/23/s1 as Supplemental Information and described in Section 3.2 for the supplemental scripts and Section 4 for the aggregated data.

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Conflicts of Interest: The authors declare no conflict of interest.

Abbreviations

The following abbreviations are used in this manuscript:

AM	Additive manufacturing
CSV	Comma-separated value (file format)
ID	Identifier
LEI	Legal entity identifier
MD5	Message-digest hashing algorithm
URL	Uniform resource locator
VAT	Value-added tax
WLW	Wer liefert was? (B2B-marketplace)

Appendix A. A1 Stop Word List

These words are excluded from counting towards the most common words on the respective website as they are identified as containing no valuable information for the purpose of this study.

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