

Programmatic Marketing Forecasts

2018



About Zenith

Zenith is The ROI agency. We blend data, technology and brilliant specialists to scout out new opportunities, solve complex challenges and grow our clients' businesses. Zenith is part of Publicis Media, one of four solution hubs within Publicis Groupe [Euronext Paris FR0000130577, CAC40], and has offices within Publicis One. We have over 6,000 brilliant specialists across 95 markets. We are experts in communications & media planning, content, performance marketing, value optimisation and data analytics. Zenith works with some of the world's leading brands including Aviva, Coty, Daimler, Electrolux, Essity, Kering, Lactalis, Nestlé, Nomad Foods, Oracle, Perrigo, RB, and 21st Century Fox.



Zenith is pleased to introduce the fourth edition of its *Programmatic Marketing Forecasts*.

We now forecast that 65% of all money spent on advertising in digital media in 2019 will be traded programmatically. Advertisers will spend US\$84bn programmatically next year, up from US\$70bn this year, which represents 62% of digital media expenditure. We predict that in 2020 advertisers will spend US\$98bn on programmatic advertising, representing 68% of their expenditure on digital media advertising. By digital media we mean all forms of paid-for advertising within online content, including online video and social media, but excluding paid search and classified advertising.

The breadth of ad formats available through programmatic trading is improving, with more mobile, video and audio formats coming online all the time, though brands and agencies need to do more to push publishers to improve the quality of their inventory, which needs at minimum to be safe and viewable.

Growth in programmatic advertising is slowing as it cements its position as the most important method of digital trading. We estimate that programmatic adspend will grow 24% in 2018, down from 32% growth in 2017, and forecast 19% growth in 2019, followed by 17% growth in 2020.

In dollar terms, the biggest programmatic market is the US, where we expect US\$40.6bn to be spent programmatically in 2018 – 58% of the total. China is in a distant second place, spending US\$7.9bn on programmatic advertising this year, followed by the UK, with US\$5.6bn of programmatic adspend.

The US is also the market that has most embraced programmatic advertising, trading 83% of all digital media programmatically this year. Canada is in second place, trading 82% of digital media programmatically, followed by the UK, with 76%, and Denmark, with 75%. By 2020, programmatic advertising will account for more than 80% of digital media in all four markets. Canada will have almost completed the transition to pure programmatic trading, spending 99% of digital media programmatically that year.

We expect all markets to follow Canada and use programmatic trading for all digital media transactions eventually. Indeed, it's only a matter of time before programmatic trading becomes the default method of

trading for all media. However, the transition is taking slightly longer than we expected – last year we forecast that 64% of digital media would be programmatic in 2018, and 67% would be programmatic in 2019, so we have pulled back both forecasts by two percentage points. The introduction of privacy legislation such as the EU's GDPR has had some chilling effect by making certain data previously used in programmatic transactions unavailable, and making other data more costly to process. But we think the main reason for the slowdown in spending on programmatic media is that advertisers are investing more in infrastructure and data to make their programmatic activity more effective.

To make the most of their programmatic campaigns, advertisers have to reorganise internally to give programmatic trading the high-level support and understanding it needs. Agencies can only extract maximum effectiveness from their programmatic strategy in a proper partnership with their clients. And a programmatic strategy can only ever be as effective as the data used to execute it.

The most valuable data is first-party data, either explicitly provided by consumers or gained by tracking their activity on owned websites. It is also becoming more common to use second-party data, by forming data sharing partnerships, between – for example – brands and online retailers. Third-party data is widely available but does not give advertisers a competitive advantage, since all advertising can use it to target the same segments. Advertisers should continually vet and interrogate third-party data to ensure they are truly adding incremental reach. By combining all this data with their own CRM systems, advertisers can model consumer behaviour, and the more advanced are using machine learning to predict it. Data and new technology is enabling brands to move from tracking cookies to communicating with individuals.

What is programmatic marketing?

Programmatic marketing is the use of technology to buy and sell digital media in an automated fashion. It uses data-driven technology to automate the trade of digital inventory and reach high-potential customers successfully and cost-efficiently.

How does it work?

Automated media buying and selling enables advertisers to trade ads in real time. Real-time bidding (RTB) grants the highest bidding advertiser the right to place an ad. RTB replaces the manual process of rate negotiation and ensures that advertisers are able to place messages in front of the correct target audience as impressions become available. The outcome of programmatic buying in real time is maximised efficiency, increased scale and competitive pricing. Automation and efficiency allow both buyers and sellers to leverage audience data for targeting purposes.

RTB is the dominant form of buying programmatic media today, however as the marketplace continues to evolve, new types of deal are emerging, such as private marketplaces (PMPs) and automated guaranteed. Automated guaranteed is the way to transact direct sales deals via programmatic methods, without the need for a Demand Side Platform (DSP). Publishers are listening to market demands and making more premium inventory available in both private and open exchanges.

Understanding programmatic technology

To fully understand the importance of programmatic marketing it is important to recognise how the media industry arrived at this point. Just over 20 years ago, a telecom client purchased the first banner ad on hotwired.com, and a new way to connect with consumers emerged.

Ad servers

Ad servers were developed to store digital ads and deliver them to website visitors. They also measure performance across the media buy.

Ad networks

Advertisers traditionally purchased the majority of their digital inventory directly from publishers. In 2002, ad networks appeared. These are media-buying companies that procure large volumes of bulk inventory, apply unique insights and data, and repackage and sell the inventory at premium rates. They alleviate the risk publishers take with unsold inventory, and provide buyers with stronger targeting and lower cost options for reaching specific targets at scale. By 2004, ad networks were beginning to purchase and package premium ad placements.

Ad exchanges

Ad exchanges emerged in 2007 to address marketplace inefficiencies of ad networks. Technology platforms that aggregate multiple publishers (websites), ad exchanges allow buyers (advertisers) and sellers (publishers) to transact directly in real-time using auction-based pricing to determine inventory distribution. They equally meet the needs of both buyer and seller, offering full transparency of publisher, advertiser and marketplace prices.

Demand Side Platform (DSP)

Demand Side Platforms (DSPs) are media buying tools that enable purchasing ad inventory via RTB exchanges across multiple pools of media and data inventory.

Advertisers set their campaign parameters within the DSP, including which creative and data to use, what audience to target, how much the marketer is willing to pay for a single impression, how many times an ad can appear to a single customer, and what time of day the ad should appear. All of these inputs are recorded so the DSP knows when to bid on a certain impression. Typically, the DSP has an algorithm that refines the parameters and optimises the campaign in real-time to focus on the type of audience that is responding most favourably. The DSP also provides reporting and analytics to gain more data and insights from campaigns.

Supply Side Platform (SSP)

Supply Side Platforms (SSPs) developed in order to enable publishers to manage their advertising impression inventory and maximise their revenue from digital media. They represent the suppliers of online ads and guarantee inventory availability. Similar to DSPs, SSPs allow publishers to automate and optimise the selling of their online media space across ad exchanges.

Agency trading desks (ATDs)

Agency trading desks (ATDs) are agency-owned and operated service offerings that manage client campaigns through DSP technology. They were created to master the complexities of programmatic media when the industry was nascent, by offering specialised services and data security, and they have grown into centres of audience-buying expertise.

Data Management Platforms (DMPs)

Marketers have an unprecedented amount of information about the customers they are trying to reach thanks to innovative digital technologies. By combining addressable marketing with programmatic buying, advertisers can now deliver keenly defined messages to specific target audiences automatically and at scale.

A Data Management Platform (DMP) makes advanced audience management and targeting possible. A DMP is a data warehouse that allows users to effectively store, organise and deploy their data out into the marketplace so that every impression - and every ad dollar - counts.

DMPs leverage data, be it first, second or third-party, to build a view of the consumer that informs targeting selections and optimisations. Ideally, DMPs bring first-party publisher data and third-party data from external companies together with client-owned data.

Private marketplace (PMP)

The open exchange is the bedrock of the programmatic ecosystem, acting as a powerful tool for discovery, reach and attribution. But concerns over transparency (exchanges don't always provide full URL transparency on publisher inventory), viewability, and access to quality inventory have fuelled the need to combine the efficiency of programmatic buying with brand safety and high-quality contextual placements.

This has given rise to the creation of private marketplaces (PMPs), which have grown in popularity. PMPs are invitation-only marketplaces where buyers and sellers transact based on a negotiated CPM. It gives preferred access to inventory from premium publishers that is typically not available in the open RTB exchange. Buying interfaces (DSPs) are able to connect to this inventory, which is made available for purchase to select advertisers. PMPs offer the ability to apply the sophisticated targeting and analytics of programmatic buying in a transparent and viewable environment.

Summary tables

Worldwide summary

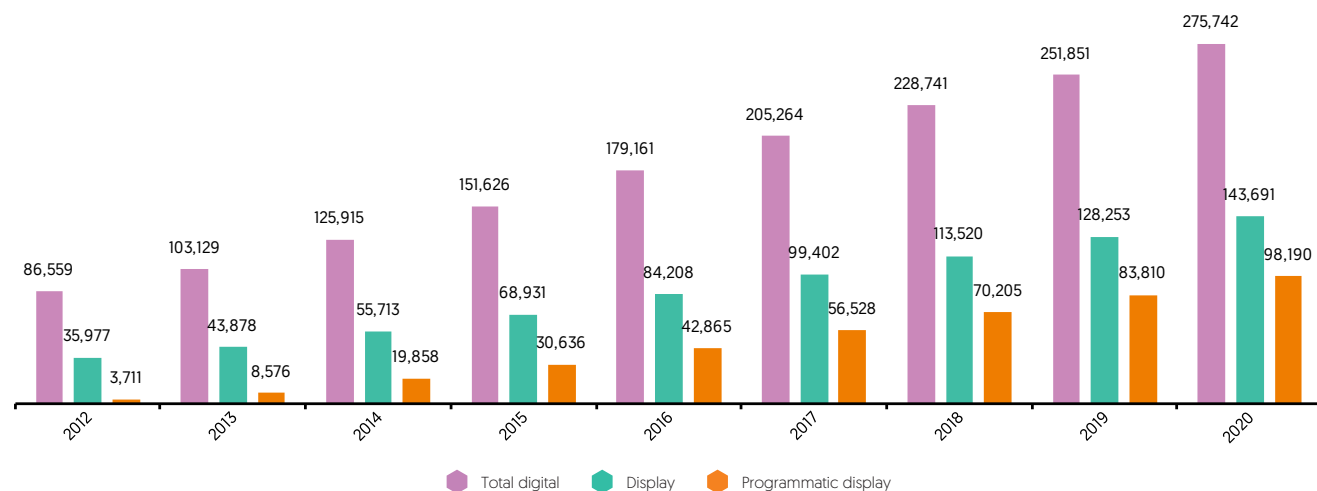
Global advertising spend (US\$ million)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total digital	86,559	103,129	125,915	151,626	179,161	205,264	228,741	251,851	275,742
Display	35,977	43,878	55,713	68,931	84,208	99,402	113,520	128,253	143,691
Programmatic display	3,711	8,576	19,858	30,636	42,865	56,528	70,205	83,810	98,190

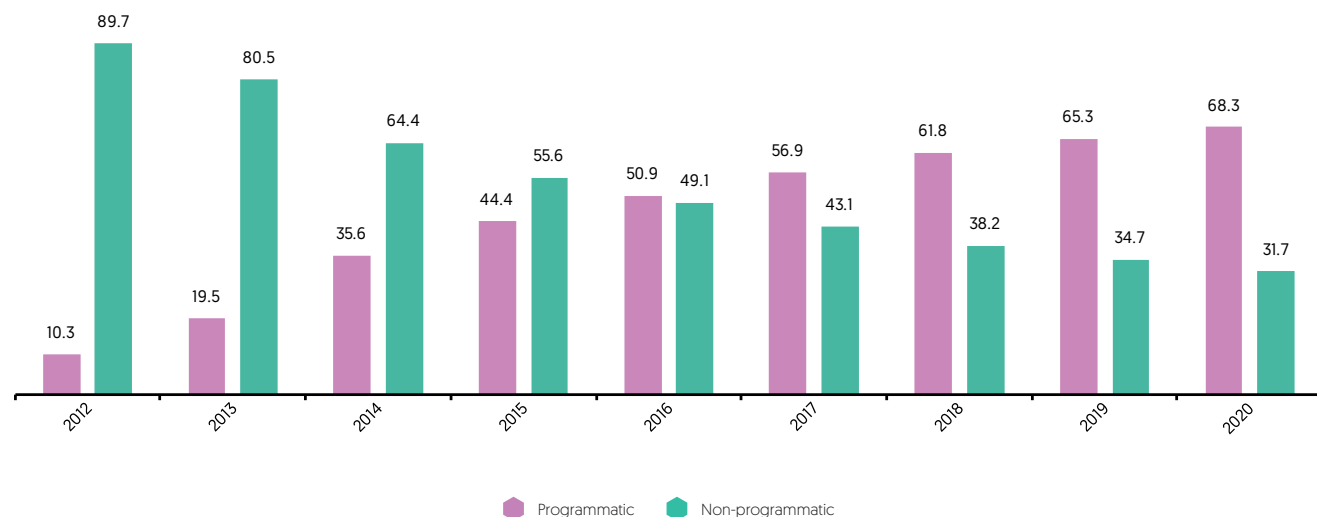
Share of digital display spend (%)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Programmatic	10.3	19.5	35.6	44.4	50.9	56.9	61.8	65.3	68.3
Non-programmatic	89.7	80.5	64.4	55.6	49.1	43.1	38.2	34.7	31.7

Global advertising spend (US\$ million)



Share of digital display spend (%)



Country summary

Programmatic advertising spend (US\$ million)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Armenia	-	0.1	0.2	0.3	0.4	1	1	1	1
Australia	61	153	240	339	520	801	1,271	1,638	2,130
Austria	1	3	7	14	55	70	84	98	114
Belgium	1	20	32	39	45	74	-	-	-
Bulgaria	-	-	0.5	1	1	2	2	3	3
Canada	-	-	382	786	1,122	1,092	1,254	1,455	1,808
Chile	-	-	-	-	44	160	148	164	185
China	88	246	777	1,848	3,297	5,336	7,902	10,773	14,893
Colombia	-	-	-	-	-	-	-	-	-
Denmark	-	47	88	149	196	259	333	408	471
Ecuador	1	1	6	8	14	16	22	27	32
Estonia	0.1	0.1	0.3	4	5	11	12	13	14
Finland	16	17	19	42	63	86	138	183	248
France	58	130	292	469	709	1,000	1,359	1,754	2,175
Germany	-	-	301	450	736	1,116	1,517	2,101	2,818
Hong Kong	-	-	8	21	47	102	164	213	278
Hungary	-	-	0.3	2	4	7	11	18	20
India	-	-	-	26	55	85	121	191	326
Ireland	-	-	-	-	-	-	-	-	-
Italy	8	47	101	212	289	401	522	626	739
Malaysia	-	-	30	39	49	62	68	75	83
Moldova	-	-	-	-	0.01	0.1	0.1	0.1	0.2
Netherlands	83	115	160	207	249	292	324	350	366
New Zealand	2	3	4	5	20	51	60	72	80
Norway	-	-	-	-	80	93	115	138	157
Peru	-	-	-	0.5	0.4	1	1	1	1
Poland	-	-	-	12	66	102	130	172	223
Romania	-	-	-	0.5	1	4	5	8	9
Russia	-	-	18	36	80	123	197	293	369
Serbia	-	-	-	1	1	2	3	6	7
Slovakia	-	-	1	3	7	11	16	22	26
Spain	-	58	56	96	148	178	223	278	328
Sweden	-	-	37	82	161	260	342	391	427
Switzerland	-	-	4	16	37	76	136	177	223
Taiwan	-	-	-	-	211	300	388	475	549
Turkey	-	-	-	7	21	189	356	408	454
Ukraine	-	1	1	3	8	17	32	62	95
United Kingdom	362	781	1,739	2,920	4,143	4,694	5,597	6,548	7,061
United States of America	2,080	5,004	12,857	19,090	26,108	33,632	40,613	47,513	54,977
Global	3,711	8,576	19,858	30,636	42,865	56,528	70,205	83,810	98,190

Display advertising spend (US\$ million)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Armenia	-	0.4	1	1	1	2	2	2	2
Australia	659	847	1,094	1,596	2,022	2,470	2,718	2,935	3,170
Austria	158	181	203	227	252	280	294	308	321
Belgium	152	165	179	162	171	394	495	578	704
Bulgaria	-	21	25	29	40	46	52	63	73
Canada	761	853	996	1,215	1,494	1,367	1,534	1,704	1,834
Chile	-	-	-	-	-	-	-	-	-
China	6,081	7,878	11,252	13,789	18,476	21,727	25,105	28,948	34,749
Colombia	55	73	87	127	153	210	249	300	366
Denmark	215	233	267	298	327	370	444	480	523
Ecuador	2	5	14	14	21	24	30	36	40
Estonia	13	13	15	22	23	34	34	34	35
Finland	156	169	126	170	209	246	287	333	382
France	819	836	1,063	1,166	1,336	1,609	1,969	2,344	2,733
Germany	1,317	1,621	1,824	2,082	2,557	3,202	3,939	5,131	6,019
Hong Kong	55	153	242	325	354	481	584	630	706
Hungary	54	65	75	83	104	122	133	147	161
India	86	189	242	317	533	662	879	1,199	1,483
Ireland	-	-	-	-	-	-	-	-	-
Italy	993	1,126	1,167	1,258	1,373	1,489	1,627	1,762	1,919
Malaysia	-	-	120	130	159	214	272	303	334
Moldova	-	-	-	-	-	-	-	-	-
Netherlands	528	577	646	672	720	760	907	996	1,086
New Zealand	80	95	98	117	136	127	133	145	160
Norway	218	264	290	300	403	466	549	629	703
Peru	-	-	-	70	72	89	95	107	116
Poland	-	-	-	299	333	377	415	446	487
Romania	7	8	9	10	12	15	17	20	22
Russia	338	386	392	405	457	564	634	693	760
Serbia	10	12	15	17	18	19	26	29	33
Slovakia	39	44	50	50	64	69	76	82	83
Spain	435	399	514	664	824	871	948	1,054	1,185
Sweden	-	-	449	509	559	616	681	710	776
Switzerland	177	193	218	269	278	294	302	316	343
Taiwan	255	279	359	431	618	789	901	964	1,030
Turkey	140	164	186	220	271	465	516	573	642
Ukraine	-	48	49	58	82	110	133	169	204
United Kingdom	2,260	2,789	3,700	4,980	5,753	6,384	7,342	8,312	8,727
United States of America	14,856	18,533	23,377	29,370	35,764	42,412	49,050	55,700	63,337
Global	35,977	43,878	55,713	68,931	84,208	99,402	113,520	128,253	143,691

Programmatic share of display advertising spend (%)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Armenia	-	25.0	40.0	37.5	40.0	37.5	41.2	38.1	36.4
Australia	9.2	18.0	22.0	21.3	25.7	32.4	46.8	55.8	67.2
Austria	0.8	1.6	3.7	6.4	21.7	25.0	28.7	31.7	35.6
Belgium	0.7	12.1	18.0	23.9	26.3	18.7	-	-	-
Bulgaria	-	-	2.0	3.8	3.1	3.9	4.3	4.5	4.6
Canada	-	-	38.4	64.7	75.1	79.9	81.8	85.4	98.6
Chile	-	-	-	-	-	-	-	-	-
China	1.5	3.1	6.9	13.4	17.8	24.6	31.5	37.2	42.9
Colombia	-	-	-	-	-	-	-	-	-
Denmark	-	20.0	33.0	50.0	60.0	70.0	75.0	85.0	90.0
Ecuador	31.9	27.1	42.9	56.3	66.7	67.3	72.4	73.7	78.9
Estonia	1.0	1.0	2.0	16.6	24.2	33.7	35.8	39.5	41.2
Finland	10.0	10.0	15.0	25.0	30.0	35.0	48.0	55.0	65.0
France	7.0	15.5	27.5	40.2	53.1	62.1	69.0	74.9	79.6
Germany	-	-	16.5	21.6	28.8	34.9	38.5	41.0	46.8
Hong Kong	-	-	3.2	6.6	13.3	21.1	28.1	33.7	39.3
Hungary	-	-	0.4	2.5	3.5	5.3	8.0	12.2	12.6
India	-	-	-	8.1	10.4	12.8	13.8	15.9	22.0
Ireland	-	-	-	-	-	-	-	-	-
Italy	0.8	4.2	8.7	16.9	21.0	27.0	32.1	35.5	38.5
Malaysia	-	-	25.0	30.0	31.0	29.0	25.2	24.8	24.8
Moldova	-	-	-	-	-	-	-	-	-
Netherlands	15.8	20.0	24.7	30.9	34.5	38.4	35.7	35.1	33.7
New Zealand	2.0	3.0	4.0	4.0	15.0	40.0	45.0	50.0	50.0
Norway	-	-	-	-	20.0	20.0	21.0	22.0	22.3
Peru	-	-	-	0.7	0.6	0.8	0.9	1.0	1.1
Poland	-	-	-	3.9	19.8	27.1	31.3	38.6	45.9
Romania	-	-	-	4.8	10.3	25.1	30.5	43.0	39.4
Russia	-	-	4.6	8.9	17.6	21.8	31.1	42.3	48.6
Serbia	-	-	-	5.3	7.0	10.0	13.2	19.5	19.8
Slovakia	-	-	2.2	6.7	10.4	16.0	20.5	27.1	30.7
Spain	-	14.5	10.9	14.4	18.0	20.4	23.5	26.4	27.7
Sweden	-	-	8.2	16.1	28.8	42.2	50.1	55.0	55.0
Switzerland	-	-	2.0	6.0	13.2	26.0	45.0	56.0	65.0
Taiwan	-	-	-	-	34.1	38.0	43.1	49.2	53.4
Turkey	-	-	-	3.3	7.9	40.7	69.1	71.2	70.7
Ukraine	-	2.0	3.0	4.8	9.5	15.6	24.0	36.5	46.7
United Kingdom	16.0	28.0	47.0	58.6	72.0	73.5	76.2	78.8	80.9
United States of America	14.0	27.0	55.0	65.0	73.0	79.3	82.8	85.3	86.8
Average	10.3	19.5	35.6	44.4	50.9	56.9	61.8	65.3	68.3

Country entries

Argentina

There are two main programmatic players in Argentina - DBM and Mediamath. There are also ad servers, with DCM and Sizment being the most relevant, as well as Smart, which also takes the role of DSP. Retargetly is still the best positioned DMP.

Over the next few years, we expect all DSPs to accommodate and deliver more robust services. There is more knowledge about programmatic in the market now, thanks to a higher standard of training and improvements to the resources dedicated to teaching; but we still need more support, and platforms that respond to the needs of advertisers.

Advertisers are also more educated now, and investment in programmatic has grown. Some advertisers already insist upon a specific proportion of their advertising being traded this way. Others feel uncertain about 'where is my communication going to be seen?', but this barrier is getting lower.

In terms of type of deal, we have many PMPs running, but everything depends on the real objective of the advertisers. We try to have a good mix between open markets and PMPs.

In the local market, we are talking about programmatic OOH, and TVSync, but it is not really something that advertisers are asking for yet.

Forecasts

Advertising spend (AMD mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total digital	0.5	0.9	1.4	1.7	1.6	2.0	2.4	2.8	3.2
Total display	-	0.4	0.5	0.8	1.0	1.6	1.7	2.1	2.2
Banners + other traditional display	-	0.3	0.4	0.5	0.7	1.0	1.0	1.2	1.3
Video	-	0.1	0.1	0.2	0.2	0.4	0.5	0.7	0.7
Native	-	-	-	0.1	0.1	0.2	0.2	0.2	0.2

Programmatic spend (AMD mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total programmatic display	-	0.1	0.2	0.3	0.4	0.6	0.7	0.8	0.8
Banners + other traditional display	-	0.1	0.2	0.2	0.3	0.4	0.5	0.5	0.5
Video	-	-	-	0.1	0.1	0.1	0.1	0.2	0.2
Native	-	-	-	-	-	0.1	0.1	0.1	0.1

Top five buy side technology in market (2017)

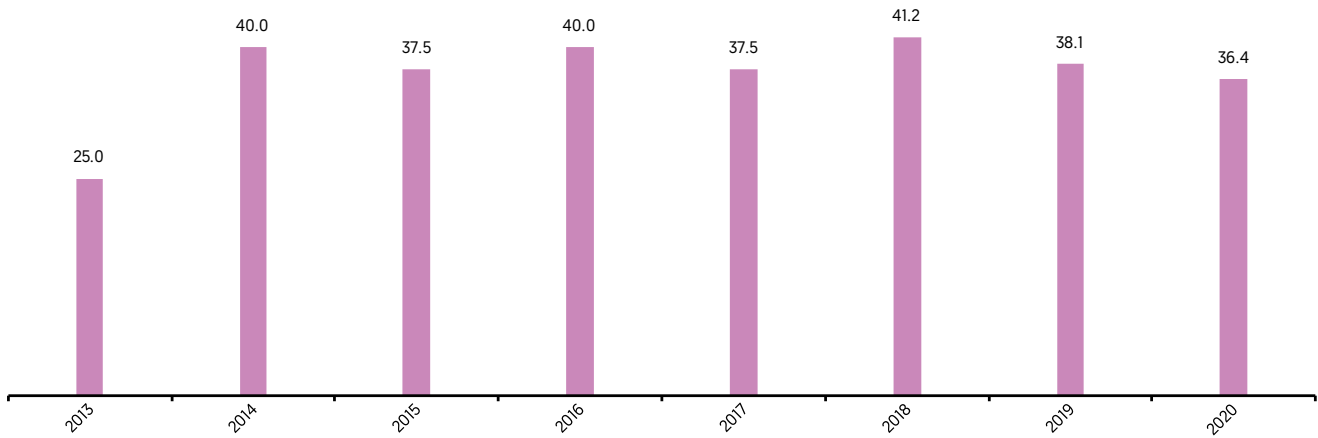
- 1 AdRiver
- 2 Doubleclick
- 3 AdFox
- 4 Adwords
- 5 Yandex

Top five sell side vendors in market (2017)

- 1 Google AdSense
- 2 AdFox
- 3 Doubleclick
- 4 AdMob
- 5 Yandex

Source: Zenith

Programmatic share of display advertising spend (%)



Programmatic buying in Armenia is in the early stages of development, and yet to reach a high standard. DSPs are used, but not to a great extent, and there are no local players in the market. The most commonly used platform is Facebook Ads Manager; others include Adfox, Doubleclick and AdRoll.

Interest in programmatic buying is low. Advertisers and customers need to understand the benefits and advantages of it, and see high-performance results on the

aforementioned platforms, to accelerate adoption. This will have a positive impact on growth.

Deals are mainly CPM with fixed price, but clients have also started to use the CPM without auction model. PPC advertising is rarely used in Armenia.

Currently, there are no services for programmatic TV or outdoor available in Armenia.

Forecasts

Advertising spend (A\$ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total digital	3,343	3,986	4,798	6,015	7,397	8,351	8,957	9,510	10,090
Total display	876	1,125	1,453	2,120	2,687	3,283	3,611	3,900	4,212
Banners + other traditional display	701	844	857	954	994	1,050	1,119	1,209	1,263
Video	175	281	581	1,124	1,612	2,134	2,347	2,535	2,780
Native	-	-	15	42	80	98	144	156	168

Programmatic spend (A\$ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total programmatic display	81.0	203.0	319.0	451.0	691.0	1,064.0	1,689.0	2,177.0	2,830.1
Banners + other traditional display	61.0	152.0	217.0	239.0	256.0	340.0	439.0	566.0	735.8
Video	20.0	51.0	99.0	203.0	415.0	692.0	1,182.0	1,524.0	1,981.2
Native	-	-	3.0	9.0	21.0	32.0	68.0	87.0	113.1

Programmatic spend by type of deal (A\$ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Open (RTB)	81.0	203.0	319.0	361.0	470.0	479.0	490.0	435.4	424.5
Private marketplaces	0.0	0.0	0.0	90.0	138.0	319.0	591.0	762.0	962.2
Preferred deals	0.0	0.0	0.0	0.0	14.0	53.0	101.0	130.6	169.8
Guaranteed	0.0	0.0	0.0	0.0	69.0	213.0	507.0	849.0	1,273.5

Top five buy side technology in market

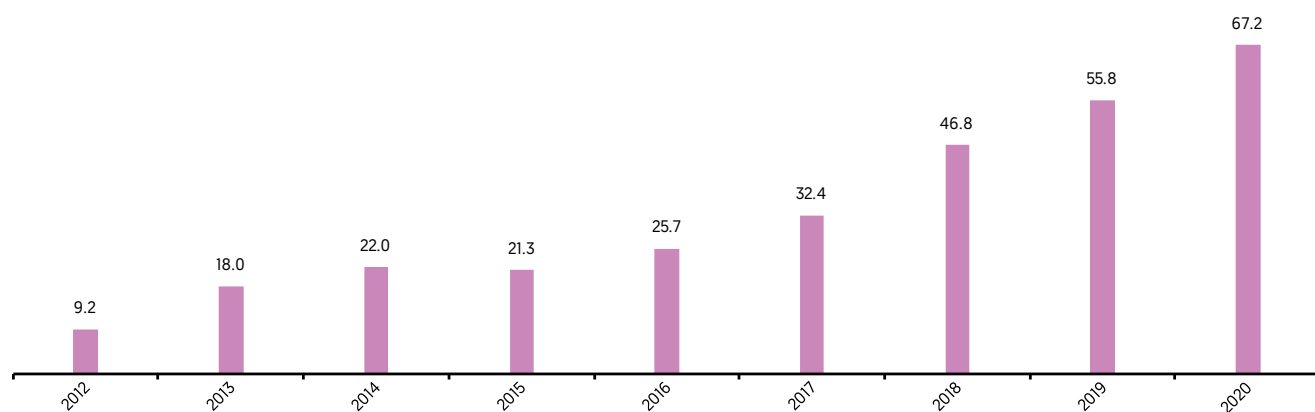
- 1 Google Display & Video 360
- 2 The Trade Desk
- 3 MediaMath
- 4 AppNexus
- 5 Adobe DSP

Top five sell side vendors in market

- 1 DoubleClick Ad Exchange
- 2 Rubicon
- 3 PubMatic
- 4 Index Exchange
- 5 AppNexus

Source: Zenith, Publicis Media, PWC, suppliers

Programmatic share of display advertising spend (%)



Cost by media channel

Average programmatic CPM by media channel (US\$)

	2012*	2013*	2014	2015	2016	2017	2018
Overall	1.64	1.63	2.15	4.28	6.58	8.13	11.14
Display	1.61	1.48	2.10	3.11	3.64	4.70	5.83
Mobile	0.50	0.75	1.04	1.58	5.35	5.30	6.64
Video	21.24	17.88	18.28	27.09	15.16	11.57	23.07
Social	-	-	2.71	7.60	8.71	10.19	11.55

Average programmatic CPC by media channel (US\$)

	2012*	2013*	2014	2015	2016	2017	2018
Overall	2.36	2.16	2.83	1.07	1.06	1.16	1.30
Display	2.60	3.19	6.41	3.51	4.74	1.99	4.38
Mobile	0.28	0.23	0.53	0.91	3.61	2.64	4.71
Video	0.36	1.03	1.44	5.75	6.50	4.22	9.07
Social	-	-	0.47	0.53	0.63	0.90	1.21

Average programmatic CTR by media channel (%)

	2012*	2013*	2014	2015	2016	2017	2018
Overall	0.07	0.08	0.08	0.40	0.62	0.70	0.86
Display	0.06	0.05	0.03	0.09	0.08	0.24	0.13
Mobile	0.18	0.32	0.20	0.17	0.15	0.20	0.14
Video	1.56	1.73	1.27	0.47	0.23	0.27	0.25
Social	-	-	0.58	1.42	1.39	1.13	0.95

Source: Zenith estimates

* Joint figures for Australia and New Zealand

Whilst adoption of programmatic technology continues to increase, the Australian market is starting to experience a consolidation of programmatic technology providers such that only the top few players will remain. This development is mainly driven by the desire to streamline technology integration, as well as to have better control over data privacy. The main driver of this growth has been a significant increase in OLV being bought programmatically. As video consumption steadily switches towards online and connected devices, so does ad investment.

Programmatic investment is expected to increase further in the coming year as trading technology for emerging media channels develop. Advertisers will be looking to shift a small percentage of previously direct IO buy on TV, OOH and radio to trial programmatic buying of the same channel in the near future.

As knowledge of programmatic improves in the market, more managed-service programmatic providers are opening up their closed platforms to allow self-service. This is also driven by a continual push for greater transparency

within all the programmatic providers, encouraging vendors and publishers to move away from the managed, black box model of trading.

Open exchange and PMP are still the most common type of trading methods. However, there has been a significant increase in the adoption of guaranteed deals in the past year. Both publishers and agencies are making moves on this, as both sides see the benefits of streamlining operation processes and increasing transparency on existing direct IO buy. Publishers have also made big steps in developing their data offerings, including enabling data access for buying as well as providing audience insights for existing campaigns. This is expected to continue being the biggest driver of programmatic growth within the publisher community. Finally, the outlook for programmatic development over the next few years is very positive. The industry has done a lot of work on measurement and third party verification in the past; the biggest challenge will be for the market to attribute campaign measurements and media metrics to positive ROI for their businesses.

Austria

Forecasts

Advertising spend (€ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total digital	225.3	263.0	307.6	348.2	388.0	421.0	444.6	467.5	490.5
Total display	142.0	163.0	182.6	204.5	227.0	251.9	264.5	277.2	289.7
Banners + other traditional display	-	-	-	-	-	-	-	-	-
Video	-	-	-	-	-	-	-	-	-
Native	-	-	-	-	-	-	-	-	-

Programmatic spend (€ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total programmatic display	1.1	2.6	6.7	13.0	49.2	63.1	76.0	88.0	103.0
Banners + other traditional display	-	-	-	-	-	-	-	-	-
Video	-	-	-	-	-	-	-	-	-
Native	-	-	-	-	-	-	-	-	-

Programmatic spend by type of deal (€ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Open (RTB)	1.1	2.0	5.0	7.3	33.3	32.7	39.0	45.0	52.0
Private marketplaces	0.0	1.0	2.0	2.5	7.5	11.9	15.0	18.0	22.0
Preferred deals	0.0	0.0	0.0	0.0	0.6	3.9	6.0	8.0	11.0
Guaranteed	0.0	0.0	0.0	3.2	7.8	14.6	16.0	17.0	18.0

Top buy side technology in market

1	DBM
2	AdForm
3	MediaMath
4	TheTradeDesk

Top sell side vendors in market

1	Improve
2	AppNexus
3	DoubleClick Ad Exchange
4	Yieldlab

Source: IAB Austria, Zenith estimates

Programmatic share of display advertising spend (%)



During the last few years, programmatic advertising has become a standard media planning and advertising strategy. The amount of inventory and the number of available data sources are increasing and pushing the market to grow faster. Those working in the Austrian market are looking at what happens in other markets and adapting this for their own needs.

In terms of education, there has been a variety of local events focusing on programmatic. Interest is increasing continuously, but there is a lack of specialists. Detailed knowledge transfer happens mainly within the agencies and agency networks.

A huge variety of technology is available in Austria, but due to the small market size there is no local representative of any provider and as a result no noticeable competition.

Most ad networks still focus on managed services and offer a small inventory and a limited number of creative formats to the programmatic markets. Nevertheless, the ad networks are working on implementing new formats and new possibilities for programmatic advertising. Private marketplaces and preferred deals are becoming more and more important. Most local publishers sell their inventory as well in open auction as in private marketplaces.

2018 was a challenging year for data-driven marketing because of GDPR, with the whole market striving to be compliant and at the same time to not lose speed in terms of further development and competitiveness. Local publishers have tended to focus on PMP deals rather than open auction since GDPR.

Within traditional media channels programmatic buying is still rare. There are digital outdoor screens programmatically connected and the first programmatic radio campaigns have been aired.

Belgium

Forecasts

Advertising spend (€ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total digital	201.0	219.1	237.3	215.0	205.3	471.0	625.0	732.0	894.0
Total display	136.7	148.9	161.2	146.2	154.4	355.3	445.7	521.1	634.7
Banners + other traditional display	102.5	111.7	120.9	109.7	117.3	270.1	338.8	396.0	481.8
Video	34.2	37.2	40.3	36.6	37.0	85.3	107.0	125.1	152.9
Native	-	-	-	-	-	-	-	-	-

Programmatic spend (€ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total programmatic display	0.9	18.0	29.0	34.9	40.6	66.5	-	-	-
Banners + other traditional display	-	18.0	29.0	27.9	31.4	55.5	-	-	-
Video	-	-	-	7.1	9.2	11.1	-	-	-
Native	-	-	-	-	-	-	-	-	-

Programmatic spend by type of deal (€ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Open (RTB)	0.9	18.0	29.0	31.9	-	-	-	-	-
Private marketplaces	0.0	0.0	0.0	3.0	-	-	-	-	-
Preferred deals	0.0	0.0	0.0	0.0	-	-	-	-	-
Guaranteed	0.0	0.0	0.0	0.0	-	-	-	-	-

Top buy side technology in market (2017)

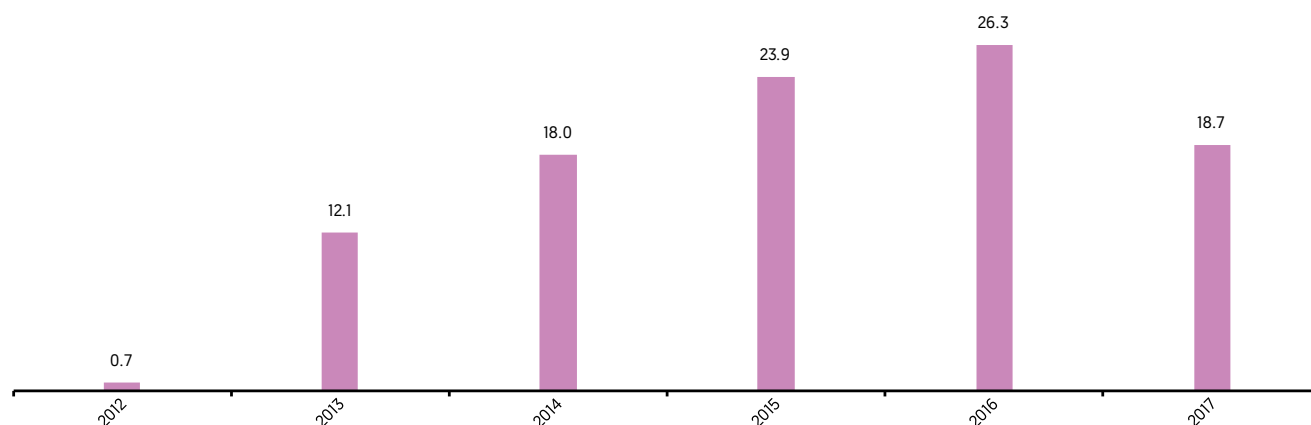
1	DBM
2	Adform
3	TTD
4	Tubemogul

Top sell side vendors in market (2017)

1	GG Adex (including YT inventory)
2	Teads
3	Spotx
4	Freewheel

Source: Ninah

Programmatic share of display advertising spend (%)



Cost by media channel

Average programmatic CPM by media channel (US\$)

	2012	2013	2014	2015	2016	2017	2018
Overall	1.03	1.30	2.24	2.96	5.03	7.19	4.69
Display	1.03	1.30	1.54	1.55	3.10	4.94	2.51
Mobile	1.03	1.30	0.54	0.74	-	-	-
Video	1.40	2.15	11.26	9.59	11.74	11.49	9.89
Social	-	-	-	-	-	-	-

Average programmatic CPC by media channel (US\$)

	2012	2013	2014	2015	2016	2017	2018
Overall	1.40	2.08	0.77	0.83	2.25	2.53	1.86
Display	1.40	2.15	1.75	1.79	2.21	2.69	1.69
Mobile	1.40	2.15	0.18	0.19	-	-	-
Video	-	0.10	0.44	0.62	2.22	2.41	1.98
Social	-	-	-	-	-	-	-

Average programmatic CTR by media channel (%)

	2012	2013	2014	2015	2016	2017	2018
Overall	0.07	0.06	0.29	0.36	0.22	0.28	0.25
Display	0.07	0.06	0.09	0.09	0.14	0.18	0.15
Mobile	0.07	0.06	0.31	0.39	-	-	-
Video	0.07	0.06	2.55	1.54	0.53	0.48	0.50
Social	-	-	-	-	-	-	-

Source: Zenith estimates

As of 2017, there was competition in Belgium's programmatic market, and the biggest players - such as Google (DBM, DCM, GA360), Adobe DMP, Spotx and Teads exchanges - were well established. Most trading desks were using Google full stack because it has a lot of advantages [YouTube inventory, free data with GDN, native]. We mostly use MOAT for viewability and ad fraud, and DBM on the DSP [Demand Side Platform] side.

Knowledge of programmatic is improving all the time. The agency educates clients, and the publishers are much more programmatic-ready. More vendors are also giving training to explain how programmatic technologies work.

There has been growth in the market because advertisers understand better how programmatic works. On the other hand, programmatic has evolved from having a focus on unsold to premium inventory. The programmatic landscape proposes smarter KPIs [VCPM, last purchase, first device], ad fraud tools, better reach, centralization and data layers. Also, publishers are more and more open to putting their inventory in an SSP [Side Supply Platform].

The majority of Belgian trading desks do not use managed services because they want to have full control and transparency. We believe in self-service, to be sure that everything is on the same platform and to maximize reach.

Most deals are PMPs [Private Marketplaces], but the market is slowly moving towards programmatic guaranteed because the biggest players are now ready to offer this.

Publishers have to be smarter now to sell their inventory; it's not just about impressions, clicks, CTR, VTR, etc. Viewability, ad fraud, and other hot topics can affect them because a lot of advertisers are aware that they can ask more in terms of data, analytics and insights, so they can choose the best performing inventories.

Within traditional media, TV is almost there with addressable TV, radio is already programmatic with audio spot on Spotify, Radionomy and online radio stations, and digital OOH is ready with Clear Channel. The huge issue is how to compare it with other digital media because you compare 'one to one' media with 'one to many' for TV and OOH.

We think that the market will evolve more and more to personalize all interactions across every touch point with a customer. These interactions could be happening across any kind of screen - be it the traditional digital display on a website or app, or on a digital screen at the airport or mall.

Forecasts

Advertising spend (Lev mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total digital	48.0	53.0	62.0	69.0	91.3	106.1	123.0	143.0	166.0
Total display	-	37.1	43.5	50.4	70.2	80.4	92.3	111.5	129.5
Banners + other traditional display	-	-	-	-	-	-	-	-	-
Video	-	-	-	-	-	-	-	-	-
Native	-	-	-	-	-	-	-	-	-

Programmatic spend (Lev mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total programmatic display	-	-	0.9	1.9	2.2	3.1	4.0	5.0	6.0
Banners + other traditional display	-	-	-	-	-	-	1.8	2.0	2.5
Video	-	-	-	-	-	-	1.2	2.0	2.5
Native	-	-	-	-	-	-	1.0	1.0	1.0

Top buy side technology in market

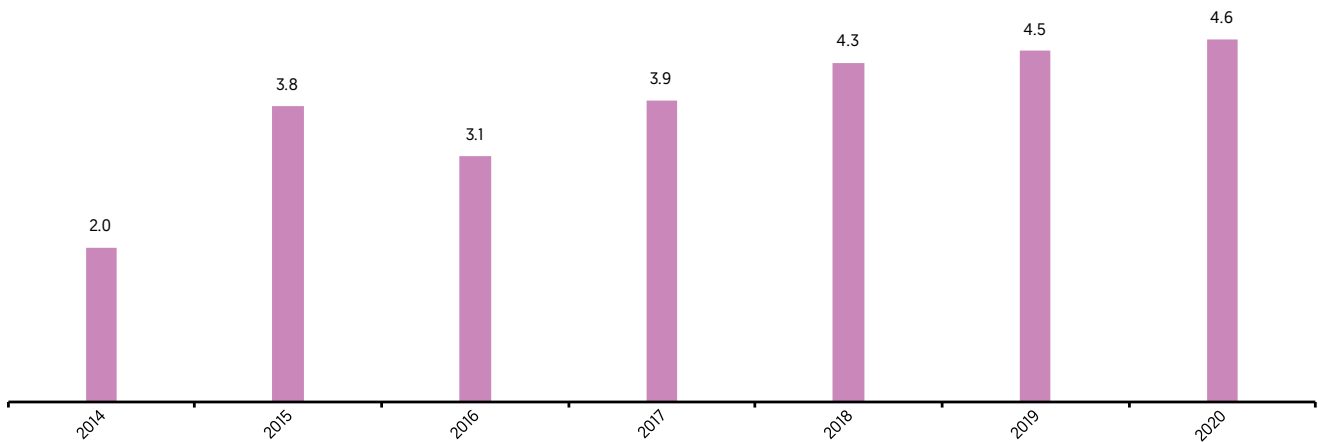
- 1 Display & Video 360 (DBM)
- 2 AdForm
- 3 AppNexus
- 4 MediaMath

Top sell side vendors in market

- 1 DoubleClick for Publishers
- 2 Smart AdServer

Source: IAB, Zenith

Programmatic share of display advertising spend (%)



Most companies are using ad servers - like Gemius and Campaign Manager, which are the most widely used – for their campaign tracking. DMPs are still not widespread within the Bulgarian market, although SSPs are often used by publishers, with DFP being the most popular. DSPs are used mainly by the agencies, and a few companies offer only programmatic buying services. There is still a lack of knowledge about programmatic among some clients, though. Education is being led mainly by the agencies.

Programmatic growth reached 43% year-on-year in 2017, according to IAB Bulgaria. More and more clients are looking to use programmatic advertising, and the process of doing so is becoming easier as the technology develops.

Managed-service is common: the service providers (mostly agencies) have access to best-in-class technologies and have considerable experience, while few clients have sufficient know-how or the requisite technology to buy programmatically in-house.

The leading deal-type is open auction.

In the next five years, programmatic investment will continue to grow. The main drivers of growth will be increased interest in the targeting and technological options available, as well as the increasing demand for custom segmented audience, premium inventory, viewability and brand safety.

Forecasts

Advertising spend (C\$ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total digital	3,073.0	3,408.0	3,782.0	4,599.0	5,485.0	5,017.8	5,632.0	6,226.0	6,703.0
Total display	974.0	1,091.0	1,274.0	1,554.0	1,911.0	1,748.3	1,962.2	2,179.1	2,346.1
Banners + other traditional display	882.0	883.0	1,008.0	1,196.0	1,430.0	1,308.2	1,468.3	1,618.8	1,742.8
Video	92.0	208.0	266.0	358.0	481.0	440.0	493.9	560.3	603.3
Native	-	-	-	-	-	-	-	-	-

Programmatic spend (C\$ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total programmatic display	-	-	489.0	1,005.8	1,434.9	1,396.9	1,604.2	1,861.2	2,313.1
Banners + other traditional display	-	-	460.6	798.8	1,138.7	1,107.9	1,259.6	1,469.0	1,876.8
Video	-	-	28.4	207.0	296.2	289.0	344.7	392.2	436.2
Native	-	-	-	-	-	-	-	-	-

Programmatic spend by type of deal (C\$ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Open (RTB)	-	-	347.0	674.0	868.0	838.2	962.5	1,079.5	1,341.6
Private marketplaces	-	-	142.0	332.0	567.0	558.8	641.7	707.3	879.0
Preferred deals	-	-	-	-	-	-	-	-	-
Guaranteed	-	-	-	-	-	-	-	74.4	92.5

Top five buy side technology in market

- 1 Google Display & Video 360
- 2 Appnexus
- 3 Amazon
- 4 The Trade Desk
- 5 Oath

Top five sell side vendors in market

- 1 Google Adx
- 2 Index Exchange
- 3 Rubicon
- 4 MoPub
- 5 Amazon SSP

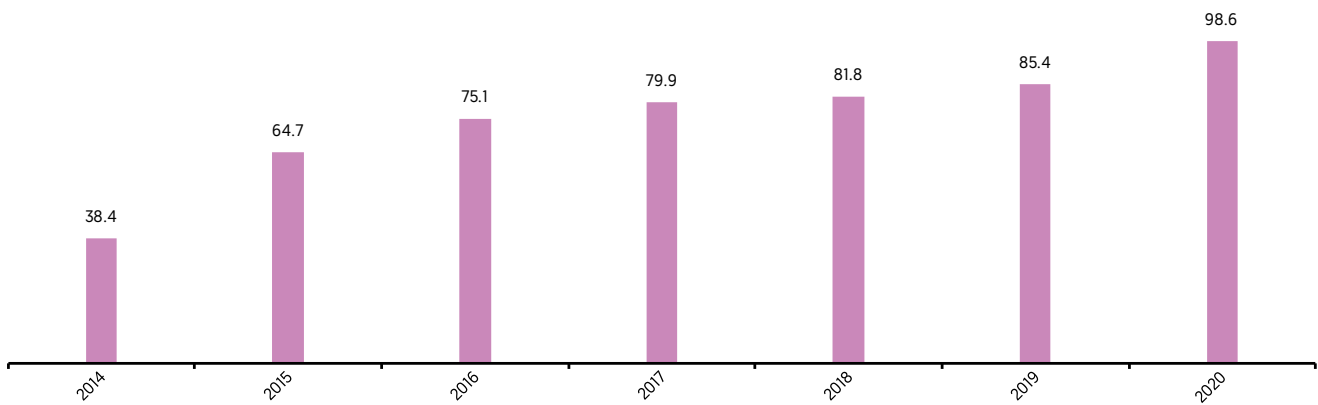
Source: Zenith, eMarketer, think TV, IAB Internet Revenue Report 2017

Programmatic spend - emerging media channels (C\$ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Newspapers	-	-	-	-	-	-	-	-	-
Magazines	-	-	-	-	-	-	-	-	-
TV	-	-	-	-	-	-	-	-	-
Radio	-	-	-	-	-	-	-	7.4	7.5
Cinema	-	-	-	-	-	-	-	-	-
Outdoor/transport	-	-	-	-	-	-	-	23.0	23.2

Source: Zenith

Programmatic share of display advertising spend (%)



Cost by media channel

Average programmatic CPM by media channel (US\$)

	2012	2013	2014	2015	2016	2017	2018
Overall	-	2.33	1.68	2.21	3.81	4.13	3.43
Display	-	2.33	1.63	2.11	2.77	3.27	2.89
Mobile	-	2.33	1.99	2.08	-	-	-
Video	-	6.37	10.83	8.38	10.95	12.91	18.89
Social	-	-	-	-	-	-	-

Average programmatic CPC by media channel (US\$)

	2012	2013	2014	2015	2016	2017	2018
Overall	-	6.37	1.18	1.55	2.08	2.28	2.76
Display	-	6.37	1.16	1.88	2.24	2.39	2.53
Mobile	-	6.37	1.18	0.37	-	-	-
Video	-	-	3.26	1.78	2.40	2.03	4.52
Social	-	-	-	-	-	-	-

Average programmatic CTR by media channel (%)

	2012	2013	2014	2015	2016	2017	2018
Overall	-	0.04	0.14	0.14	0.18	0.18	0.12
Display	-	0.04	0.14	0.11	0.12	0.14	0.11
Mobile	-	0.04	0.17	0.57	3.26	-	-
Video	-	0.04	0.33	0.47	0.46	0.63	0.42
Social	-	-	-	-	-	-	-

Source: Zenith estimates

Adoption of programmatic is high in Canada; all major advertisers and agencies use a variety of programmatic solutions to deliver media to the marketplace. There is competition between adoption of certain ad stacks in the market, primarily between Google and Adobe.

Continually demystifying the negative perception of programmatic ads and the risks involved (for example, brand safety and offensive content) has driven growth, and there has been an increase in executional talent. The Canadian programmatic market will continue to grow past 2020.

The trend within the Canadian market is shifting from managed service buys to more hands-on-keyboard execution. As agencies and clients become more proficient at the execution of programmatic digital, the need for managed services diminishes.

The programmatic offerings of all major publishers have grown over the last 18 months, and this will continue. Currently, only a few buys cannot be done programmatically (viz. HPTOs and certain custom executions). However, once these are brought into the programmatic ecosystem, reasons to buy outside of a self-serve capacity will be limited.

There is only a small pool of programmatic-specific talent, and a general lack of knowledge in the industry overall. However, agencies and vendors, along with the IAB and the CMDC, continue to drive the programmatic education agenda.

Private marketplace deals are most common in Canada, but programmatic guaranteed deals are becoming more prevalent as there is a lack of quality inventory available through auction, especially within programmatic video.

Increased demand for inventory, along with the expansion and development of technology, will lead to increased staffing. Lack of programmatic inventory, again especially within video, will hopefully drive publishers to grow their offerings.

With the exception of out-of-Home, there are no true programmatic opportunities in traditional media currently within our market. While traditional broadcasters are attempting to put forth programming offerings for TV, this remains in the early testing phases and we do not expect to see a finished product any time before 2021.

Chile

Forecasts

Advertising spend (Pesos mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total digital	52,469	65,332	85,031	105,376	133,427	157,444	177,039	217,395	265,474
Total display	-	-	-	-	-	-	-	-	-
Banners + other traditional display	-	-	-	-	-	-	-	-	-
Video	-	-	-	-	-	-	-	-	-
Native	-	-	-	-	-	-	-	-	-

Programmatic spend (Pesos mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total programmatic display	-	-	-	-	28,611	104,785	96,949	107,592	120,879
Banners + other traditional display	-	-	-	-	-	-	-	-	-
Video	-	-	-	-	-	-	-	-	-
Native	-	-	-	-	-	-	-	-	-

Programmatic spend by type of deal (Pesos mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Open (RTB)	-	-	-	-	23,078	100,787	91,475	99,926	109,159
Private marketplaces	-	-	-	-	41	1,173	651	782	1,129
Preferred deals	-	-	-	-	5,492	2,826	3,252	3,742	4,305
Guaranteed	-	-	-	-	0	0	1,571	3,143	6,286

Top buy side technology in market

- 1 Display and Video 360
- 2 MediaMath

Top five sell side vendors in market

- 1 DoubleClick Ad Exchange
- 2 AppNexus
- 3 TeadsTv
- 4 SpotX
- 5 BidSwitch

Source: Zenith

The growth of programmatic has been accelerating this year because the whole market has been moving towards this kind of buying. Clients are focusing more on metrics such as viewability, brand safety, audiences, etc.

Self-service has boomed this year as agencies have started to create their in-house programmatic teams. Knowledge about programmatic has been patchy but the situation is improving as agencies and clients become more educated about the possibilities.

The most common type of deal in Chile is the preferred deal. Not all providers have adopted the technology needed to enable guaranteed or PMP deals.

Programmatic buying of inventory on TV and out-of-Home is in the experimental stage, and we are keeping a close eye on how this is progressing in other markets, mainly in the US and Europe.

Clients are keen to use more programmatic buying, but there is a need for more expertise within agencies themselves. As the situation improves, we expect programmatic to grow.

Forecasts

Advertising spend (RMB mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total digital	75,291	110,000	154,000	209,440	263,894	306,118	342,852	377,137	407,308
Total display	37,871	49,060	70,070	85,870	115,058	135,304	156,340	180,271	216,401
Banners + other traditional display	26,126	31,460	38,346	46,077	44,862	47,448	49,371	50,536	51,547
Video	4,819	7,810	12,320	17,174	21,903	25,102	26,400	27,154	31,498
Native	6,927	9,790	19,404	22,620	48,293	62,754	80,570	102,581	133,356

Programmatic spend (RMB mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total programmatic display	550	1,530	4,840	11,510	20,530	33,230	49,210	67,090	92,745
Banners + other traditional display	-	-	-	-	-	-	-	-	-
Video	-	-	-	-	-	-	-	-	-
Native	-	-	-	-	-	-	-	-	-

Programmatic spend by type of deal (RMB mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Open (RTB)	550	1,440	3,209	7,505	10,778	13,358	17,174	19,724	21,697
Non-RTB	0	87	1,631	4,005	9,752	19,872	32,036	47,366	71,048

Top five buy side technology in market

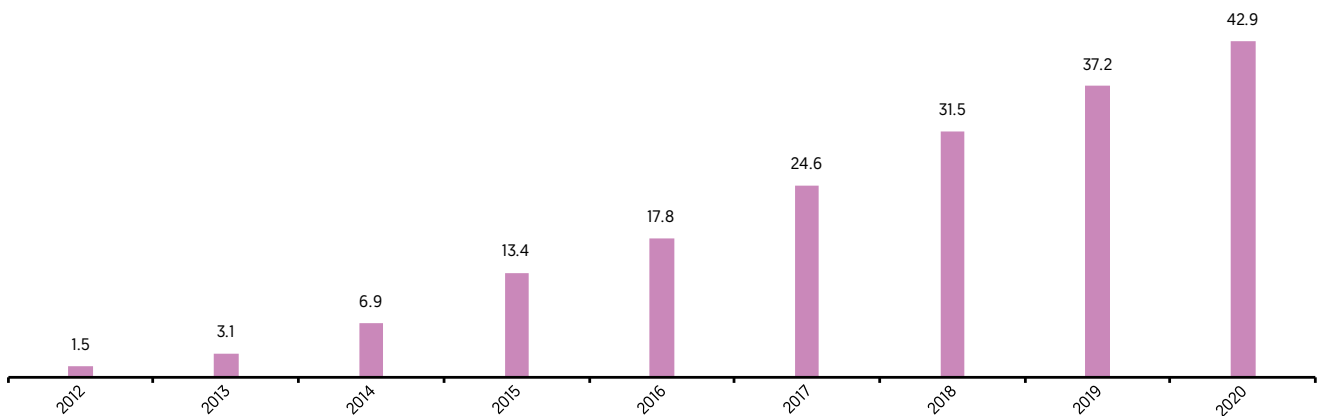
- 1 Tencent DSP
- 2 Alibaba DSP
- 3 Baidu DSP
- 4 iPinyou
- 5 Yoyi

Top five sell side vendors in market

- 1 Tencent
- 2 Baidu
- 3 Alibaba
- 4 Google
- 5 iQiyi

Source: China Programmatic Market Forecast, iResearch, 2017

Programmatic share of display advertising spend (%)



RTB used to be the main type of deal, but its market share is decreasing and non-RTB is expected to account for almost 65% of programmatic spend at the end of 2018. PMPs are growing because of their transparent resources and high efficiency. PDB is changing, and the biggest change has been the popularity of feed ads. PDB 1.0 was mainly about OTV inventory, whereas now feed ads and OTV inventory are working together.

The market is now moving from DMPs to PMPs, although this shift remains in the early stages. Some advertisers have been building their own [in-house] DMPs via third parties or agencies.

Programmatic development in PC and mobile is saturated, OTT [smart TVs, connected to internet devices] and OOH is the next trend. The technology is mature and can be applied to new media - some OTT programmatic has been developed. However, legislation and supervision set many limits. Also, the monitoring system has not been set up yet for OTT and OOH.

There are still hurdles in programmatic to overcome.

Advertisers still have doubts about the quality of digital ads, and ad verification is not as used in the Chinese market as in others [the GIVT definition for invalid traffic has been well accepted, but not SIVT]. Therefore, they have concerns about existing data traffic fraud and worry about context safety. Thus, they have become stricter about ad monitoring and KPI measurement. On the other hand, advertisers want to raise awareness and reach mass audiences instead of just focusing on pinpointing targets. They prefer optimizing their media mix than concentrating on just one type.

DSPs in China are relatively unsophisticated and sometimes not particularly user-friendly. This is a result of the market's legacy of service-based solutions, meaning quite a few of the optimization levers that may be common in western DSPs are not available in Chinese DSPs in the same way. [Some levers might be available internally to DSPs but not as platform features to users.]

Forecasts

Advertising spend (US\$ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total digital	81.1	115.3	127.6	101.6	147.6	162.3	178.6	196.4	216.1
Total display	55.0	73.0	86.5	127.4	152.8	210.2	248.7	300.1	366.2
Banners + other traditional display *	52.8	68.2	77.9	114.2	120.8	160.2	181.5	217.2	259.5
Video	2.1	4.8	8.7	13.2	32.0	50.0	67.1	82.9	106.7
Native	-	-	-	-	-	-	-	-	-

Programmatic spend (US\$ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total programmatic display	-	-	-	-	2.4	6.0	7.4	9.2	11.8
Banners + other traditional display	-	-	-	-	-	-	-	-	-
Video	-	-	-	-	-	-	-	-	-
Native	-	-	-	-	-	-	-	-	-

Top five buy side technology in market

- 1 Display & Video 360
- 2 Mediama
- 3 Sonata [TapTap]
- 4 Centro
- 5 Appnexus

Top five sell side display vendors in market

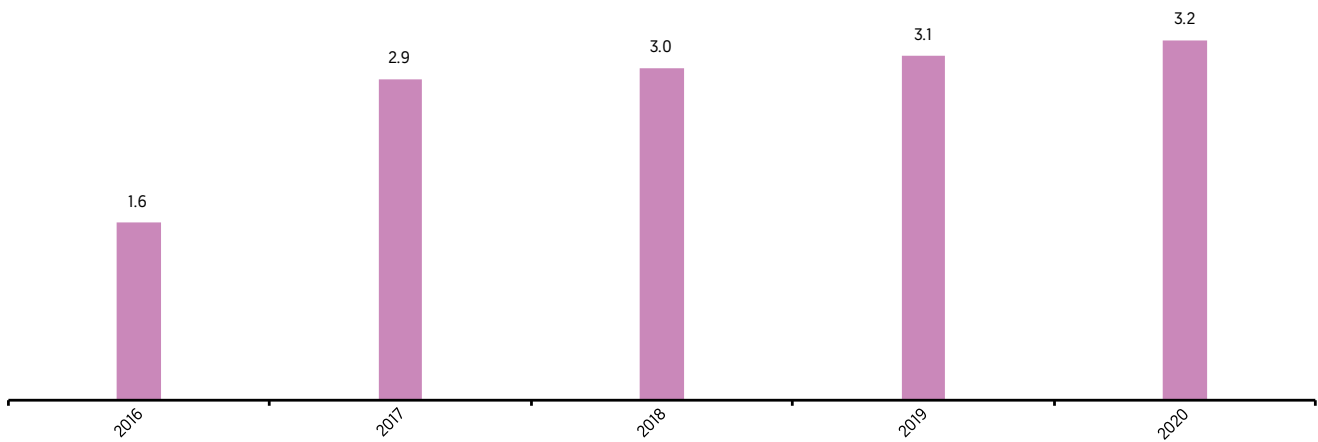
- 1 El Tiempo
- 2 Semana
- 3 El Espectador
- 4 Caracol Next
- 5 Pera Digital

Top five sell side video vendors in market

- 1 Teads
- 2 Impaktu
- 3 Adman
- 4 Scroller Ads
- 5 SpotX

Source: IAB Colombia, comScore, eMarketer, Forrester, G2 Crowd, Zenith
 * includes 'other' spend

Programmatic share of display advertising spend (%)



The market in Colombia is growing, and we expect programmatic spend to increase by 23% this year. The reason for this is that programmatic is efficient, plus clients want to learn about and experiment with it. Also, large global clients are bringing their own guidelines to bear and helping to push the market forward.

Most buying is done on the open market, but PMPs are common. Preferred deals and private auction deals are the most common private marketplaces for premium inventory purchase. The most common trend in the market is for managed service, which allows specialists on a trading desk to take full control of the campaign's performance, enabling quick responses and adjustments (optimizations) in a constantly changing environment.

One factor affecting programmatic growth is the lack of SSP knowledge in the region. There are a few experts in the field who can provide troubleshooting help for advertisers, but more knowledge is required. Some still think of programmatic as a mechanized solution that works by itself with no oversight required, whereas a vigilant approach yields best results.

We have started to buy audio on digital radio programmatically, and also integrated OOH with some mobile DSPs. Expectations are high as this is a growing trend in several Latin American markets, and we think this will expand over the next two years, eventually including TV as well.

There are a few providers of programmatic solutions in Croatia, and some in-house agency solutions too. Lots of network providers are also looking for opportunities to provide programmatic advertising. However, not many of the big domestic sites are open for programmatic sales, and the adoption rate is slow.

Growth in programmatic has also been slow, and we estimate programmatic spend at less than €1 million.

There is a lack of knowledge, and a high 'fear' factor among publishers in opening their inventory to programmatic buying; they fear losing control and influence over the buying process. Some of the biggest agencies are marginalising the importance of programmatic advertising, while some smaller ones are preaching about it.

Since programmatic trading is still in the early stages, it is difficult to see any clear trends between managed-service and self-service spend. There are different approaches - some clients are handling programmatic by themselves, some are using third party solutions.

The most common type of deal is direct buying from publishers, and it has been for a long time.

There is a start-up called 'TVBeat' that is changing its business model from providing real-time audience data to enabling programmatic on IPTV set-top boxes, in cooperation with T-HT, the largest telecoms company in Croatia. But it is still in its infancy, and will take a few years to achieve real scale.

As mentioned previously, the biggest obstacle to programmatic trading in Croatia is the local publishers and their unwillingness to open up to programmatic buying. They also do not want to invest in infrastructure or provide any education.

Czech Republic

Forecasts

Advertising spend (Kc mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total digital	5,352	6,072	6,570	7,055	7,930	8,520	9,025	9,600	10,100
Total display	2,845	3,133	3,340	3,540	3,830	3,990	4,145	4,350	4,410
Banners + other traditional display	2,235	2,426	2,530	2,529	2,721	2,251	1,921	1,922	1,804
Video	610	708	810	1,011	1,109	1,432	1,820	2,023	2,205
Native	-	-	-	-	-	307	404	405	401

Programmatic spend (Kc mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total programmatic display	-	1.0	2.0	2.0	3.0	9.7	12.0	15.0	20.0
Banners + other traditional display	-	0.8	1.5	1.2	1.8	6.0	6.0	8.0	9.0
Video	-	0.2	0.5	0.8	1.2	2.2	4.0	5.0	8.0
Native	-	-	-	-	-	1.5	2.0	2.0	3.0

Programmatic spend by type of deal (Kc mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Open (RTB)	-	1.0	2.0	1.8	2.5	6.7	7.0	5.0	5.0
Private marketplaces	-	0.0	0.0	0.2	0.5	3.0	5.0	10.0	15.0
Preferred deals	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Guaranteed	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Top five buy side technology in market

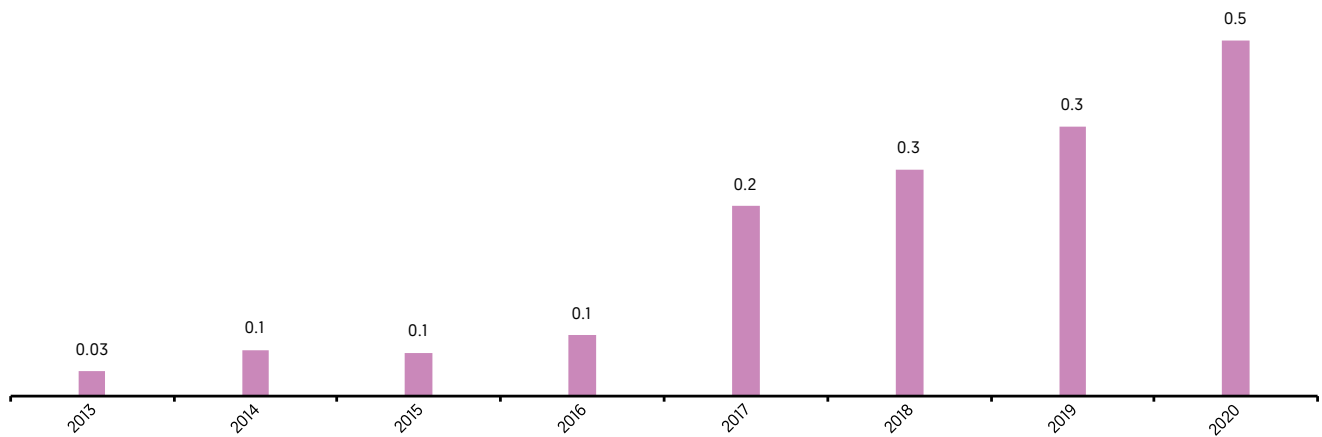
- 1 Adform
- 2 DV360
- 3 AdWords
- 4 Sklik
- 5 Facebook

Top five sell side vendors in market

- 1 Google
- 2 Rubicon
- 3 Seznam
- 4 Facebook
- 5 R2B2

Source: Adform, DV360

Programmatic share of display advertising spend (%)



In the Czech Republic, the DSPs used include AdForm, Doubleclick and Mediamath; some agencies also use their own trading desks. Ad servers include Adform, DCM and Cerebro Ad. In 2018, the biggest publishers in the Czech market are Mafra, Seznam, Czech News Center, Economia and Vltava Labe Media. There are many exchanges: for example, Rubicon, Pubmatic, Ibillboard, Doubleclick Exchange, Appnexus, R2B2, Impression Media, Nova, Vltava Labe Media, Prima Online, Admaster and Seznam.

The main publishers who entered programmatic buying in 2016/2017 are driving market growth. The inventory available is much bigger, and there have been format extensions [banners, branding, video, mobile and rich media].

Many agencies use self-service to have full control over their campaigns; they also use third-party data providers or private deals.

The biggest leaders in programmatic buying education in 2015/16 were exchanges or media prosecutions Capex and R2B2. These companies participated in the development of new formats and the application of the RTB system into the publishers' systems. In 2017, this role was taken over by vendors that had started to adapt RTB in their own business models. Agencies are also moving forward, as clients want to have unique formats and concepts for their RTB strategy. The most common deals are private deals with floor prices or fixed CPMs. The deals are negotiated on a yearly basis with revisions by client or agency.

One of the barriers to programmatic growth is the low level of education around the subject. Performance-oriented clients are well-educated, but there is still a lack of knowledge among the traditional TV or branding clients. Education is mostly driven by agencies and vendors [such as AdForm or DoubleClick/Google]. A focus on education will drive image/branding clients to use programmatic trading for video, branding, rich media, and so on.

Denmark

Forecasts

Advertising spend (DKr mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total digital	4,543.0	4,924.0	5,458.0	6,138.0	6,719.0	7,357.0	7,798.4	8,422.3	9,180.3
Total display	1,447.0	1,566.0	1,794.0	2,005.9	2,202.0	2,490.0	2,988.2	3,227.2	3,517.7
Banners + other traditional display	-	1,379.6	1,589.5	1,504.4	1,453.3	1,518.9	1,583.7	1,710.4	1,864.4
Video	-	186.4	204.5	501.5	748.7	971.1	1,404.4	1,516.8	1,653.3
Native	-	-	-	-	-	-	-	-	-

Programmatic spend (DKr mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total programmatic display	-	313.2	592.0	1,003.0	1,321.2	1,743.0	2,241.1	2,743.1	3,165.9
Banners + other traditional display	-	281.9	503.2	802.4	977.7	1,194.0	1,411.9	1,508.7	1,582.9
Video	-	31.3	88.8	200.6	330.3	522.9	784.4	1,097.3	1,329.7
Native	-	-	-	-	13.2	26.1	44.8	137.2	253.3

Programmatic spend by type of deal (DKr mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Open (RTB)	-	-	438.1	702.1	924.8	1,220.1	1,456.7	1,234.4	1,266.4
Private marketplaces	-	-	153.9	200.6	264.2	348.6	448.2	548.6	633.2
Preferred deals	-	-	0.0	100.3	132.1	174.3	224.1	548.6	633.2
Guaranteed	-	-	0.0	0.0	0.0	0.0	112.1	411.5	633.2

Top buy side technology in market

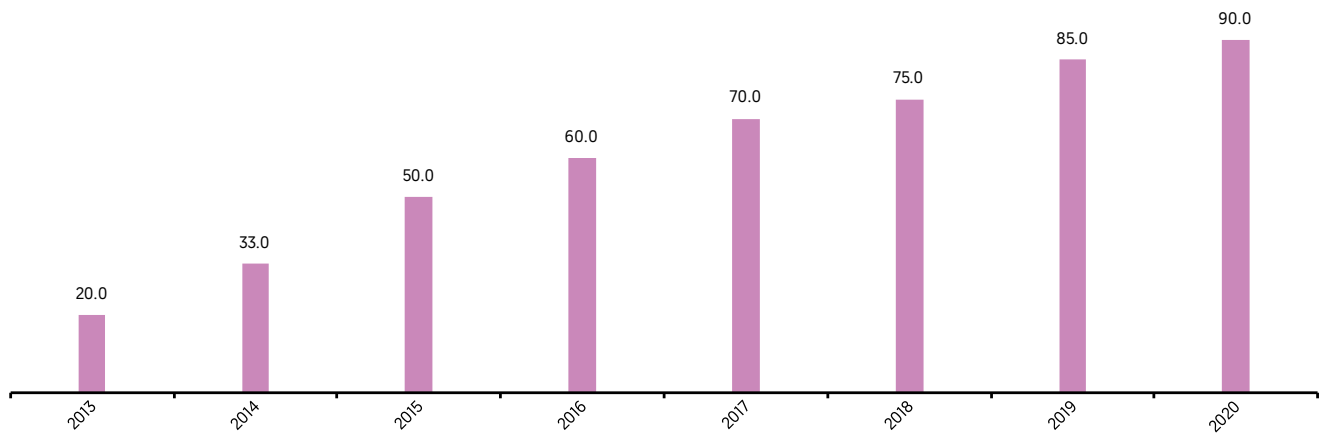
- 1 Google Display & Video 360
- 2 AppNexus
- 3 Adform
- 4 Mediamath

Top five sell side technology in market

- 1 Google Ad Manager
- 2 Adform
- 3 PubMatic
- 4 AppNexus
- 5 Freewheel

Source: Adform, Google, Zenith

Programmatic share of display advertising spend (%)



Cost by media channel

Average programmatic CPM by media channel (US\$)

	2012	2013	2014	2015	2016	2017
Overall	-	11.55	0.19	7.59	6.25	6.15
Display	-	11.55	0.19	-	-	5.74
Mobile	-	11.55	-	-	-	7.35
Video	-	37.11	-	-	-	16.28
Social	-	-	-	-	-	-

Average programmatic CPC by media channel (US\$)

	2012	2013	2014	2015	2016	2017
Overall	-	37.11	0.0004	2.40	3.87	7.28
Display	-	37.11	0.0004	-	-	10.01
Mobile	-	37.11	-	-	-	5.46
Video	-	-	-	-	-	2.06
Social	-	-	-	-	-	-

Average programmatic CTR by media channel (%)

	2012	2013	2014	2015	2016	2017
Overall	-	0.03	50.00	0.32	0.16	0.08
Display	-	0.03	50.00	-	-	0.06
Mobile	-	0.03	-	-	-	0.13
Video	-	0.03	-	-	-	0.79
Social	-	-	-	-	-	-

Source: Zenith estimates

The programmatic market in Denmark is increasing year on year and we estimate that 75% of digital display spend in 2018 will be allocated to programmatic, up from 70% last year. As the market continues to grow, publishers continue to develop and tap into the use of data. The appetite for knowledge around programmatic continues to be very high, but the current knowledge levels vary a lot.

There are various DSPs [Demand Side Platforms] accessible in the market, primarily US-based firms such as AppNexus, Google Display & Video 360, and Mediamath. Nordic-based DSP providers include Adform and Delta Projects, which still have a strong hold on a lot of legacy accounts. Most agencies in Denmark have a multiple-DSP approach. There is also an increasing interest in and use of data, both from third-party providers and companies that own first-party data.

In general, the ad networks are integrated in various SSPs, here primarily Adform and Google Ad Manager, with most publishers using the latter. In Denmark their inventory is available from both the open market and private marketplaces [PMPs]. The DSPs offering a managed service are losing business, as advertisers and agencies establish their own in-house trading desks.

Currently the most common deals are private marketplace deals. It varies from agency to agency whether deals are negotiated on the top level to be used across the entire client base, or made individually for each advertiser. The adoption of programmatic guaranteed has grown slowly and will continue to do so over the next few years, although this segment of the market does not yet account for 5% of the total. For standard campaigns, we are working exclusively by self-managed programmatic solutions. Some rich media formats are blocked programmatically by the publishers, forcing us to book through standard reservations or programmatic guaranteed.

Linear TV has not yet been offered programmatically, and is not expected to be in the near future. Some programmatic radio is being tested but has not yet been implemented in the market. Outdoor vendors are slowly moving into using digital screens, which means that programmatic outdoor buying is right around the corner.

Most publishers have enabled header bidding, but we have not yet experienced the expected sharp rise in prices.

Forecasts

Advertising spend (US\$ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total digital	5.6	7.4	20.0	20.1	28.4	31.1	39.7	47.7	53.2
Total display	1.8	5.5	14.0	14.3	21.3	23.5	30.2	36.2	40.4
Banners + other traditional display	1.6	4.9	12.3	12.1	17.4	13.0	14.5	15.5	14.9
Video	0.1	0.3	0.9	1.1	2.2	8.3	12.2	16.3	19.4
Native	0.1	0.3	0.8	1.0	1.8	2.2	3.6	4.4	6.1

Programmatic spend (US\$ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total programmatic display	0.6	1.5	6.0	8.0	14.2	15.8	21.9	26.7	31.9
Banners + other traditional display	0.6	1.4	5.7	7.6	13.1	10.3	13.1	14.7	17.6
Video	-	-	0.3	0.5	1.1	5.5	8.7	12.0	14.3
Native	-	-	-	-	-	-	-	-	-

Programmatic spend by type of deal (US\$ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Open (RTB)	0.6	1.5	6.0	8.0	14.2	15.8	21.9	26.7	31.9
Private marketplaces	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Preferred deals	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Guaranteed	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Top buy side technology in market

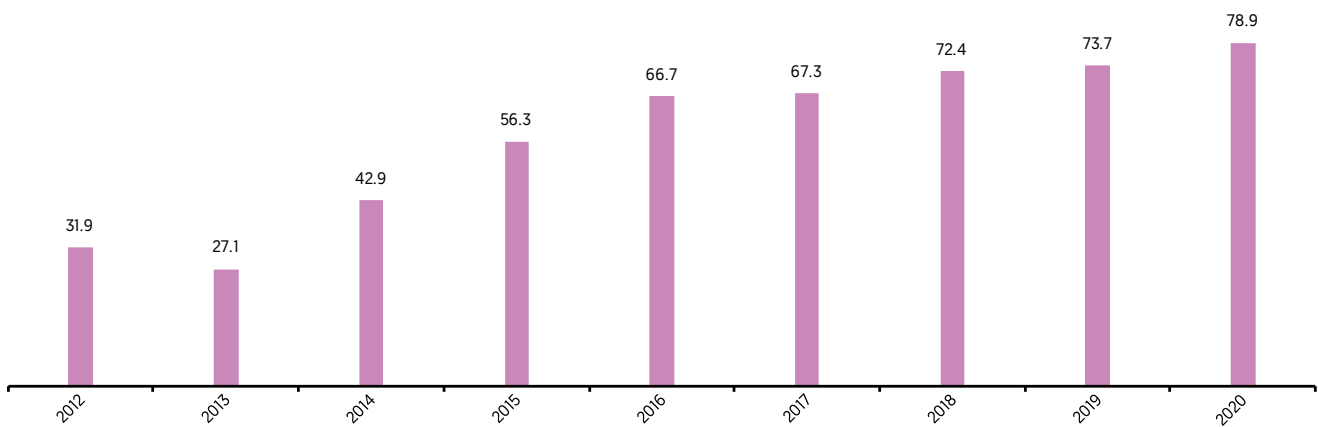
- 1 Brickthunder- Basos DSP

Top sell side vendors in market

- 1 Territorio Digital
- 2 IMS
- 3 Logan

Source: Zenith

Programmatic share of display advertising spend (%)



Programmatic has been growing fast, and while the main programmatic technology used in Ecuador is DSPs, some DMPs and international ad servers are available.

Over the past four years, agencies and advertisers have learned more about programmatic trading, and publishers are more open to putting inventory on the market, although still only up to around 45%, with the rest remaining direct

sale. Currently, all programmatic trading is open-market RTB.

We are starting to see programmatic being used with radio for some international radio stations that stream online.

One barrier to overcome is that direct trading with platforms like Facebook and Google already deliver strong results at low cost.

Forecasts

Advertising spend (€ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total digital	12.0	13.3	15.8	23.2	25.7	38.3	38.9	40.0	41.5
Total display	11.6	12.1	13.6	19.5	20.3	30.3	30.7	30.4	31.5
Banners + other traditional display	11.3	11.7	12.9	18.1	18.4	26.8	26.6	25.6	26.0
Video	0.2	0.4	0.7	1.2	1.4	2.8	3.4	4.0	4.7
Native	-	-	-	0.2	0.5	0.8	0.8	0.8	0.8

Programmatic spend (€ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total programmatic display	0.1	0.1	0.3	3.2	4.9	10.2	11.0	12.0	13.0
Banners + other traditional display	0.1	0.1	0.3	3.0	4.4	8.5	8.8	9.1	9.2
Video	-	-	-	0.2	0.5	1.7	2.2	2.9	3.8
Native	-	-	-	-	-	-	-	-	-

Programmatic spend by type of deal (€ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Open (RTB)	0.1	0.1	0.3	3.2	4.9	10.2	11.0	12.0	13.0
Private marketplaces	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Preferred deals	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Guaranteed	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Top buy side technology in market

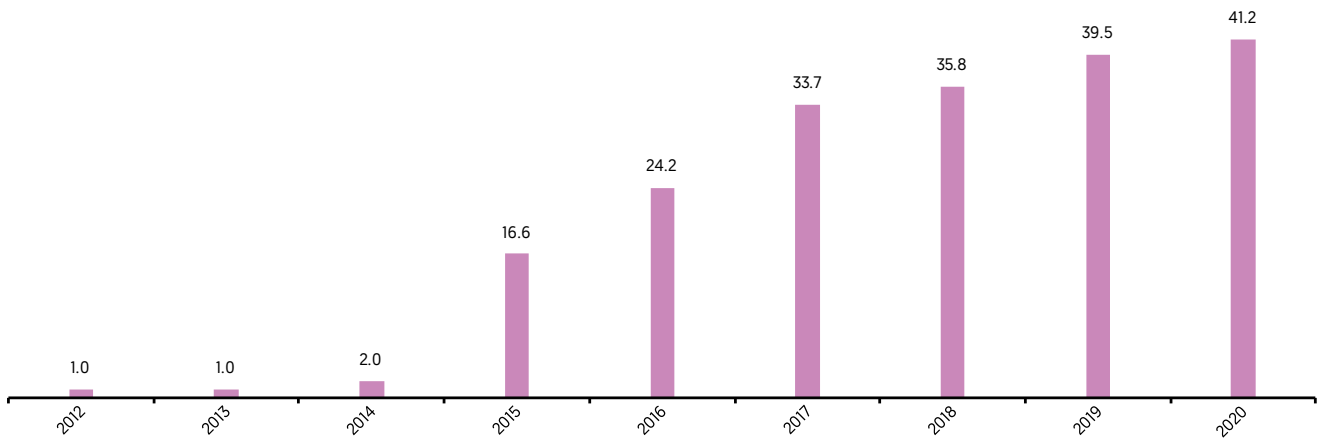
- 1 Adform
- 2 DoubleClick Bid Manager
- 3 AdTarget.Me
- 4 Google ad exchange

Top sell side vendors in market

- 1 Google ad exchange
- 2 Adform

Source: TNS Emor AdEx survey, Zenith

Programmatic share of display advertising spend (%)



The principal sell-side vendors are Google ad exchange and AdForm. Local publishers have the opportunity to sell premium formats, which do not interrupt the consumer, at three to four times the price of more general formats. Local publishers can deliver fast reach and this gives them an advantage. The quality of segments and targeting still needs to develop further for advertisers to commit increased budgets. Over-targeting in a small market could be very harmful for advertisers.

Marketers are interested in programmatic and the topic is very popular, with more Estonian pages having joined programmatic networks. Many marketers use programmatic as a supportive channel and to test the opportunities available. CPM buying is still the most common type of deal.

Outdoor vendors are dabbling in programmatic trading too, selling package deals to increase visibility in some segments.

Forecasts

Advertising spend (€ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total digital	222.4	237.7	242.0	285.9	324.0	370.0	410.0	464.5	515.0
Total display	141.0	152.0	114.0	153.0	188.0	222.0	259.0	300.0	344.0
Banners + other traditional display	-	-	-	-	-	-	155.4	150.0	165.1
Video	-	-	-	-	-	-	77.7	105.0	120.4
Native	-	-	-	-	-	-	25.9	45.0	58.5

Programmatic spend (€ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total programmatic display	14.1	15.2	17.1	38.3	56.4	77.7	124.3	165.0	223.6
Banners + other traditional display	-	-	-	-	-	-	-	-	-
Video	-	-	-	-	-	-	-	-	-
Native	-	-	-	-	-	-	-	-	-

Top five buy side technology in market

- 1 AdForm
- 2 Google Marketing Platform
- 3 Media Math
- 4 AppNexus
- 5 Xaxis

Top sell side vendors in market

- 1 AdForm
- 2 AppNexus
- 3 Google

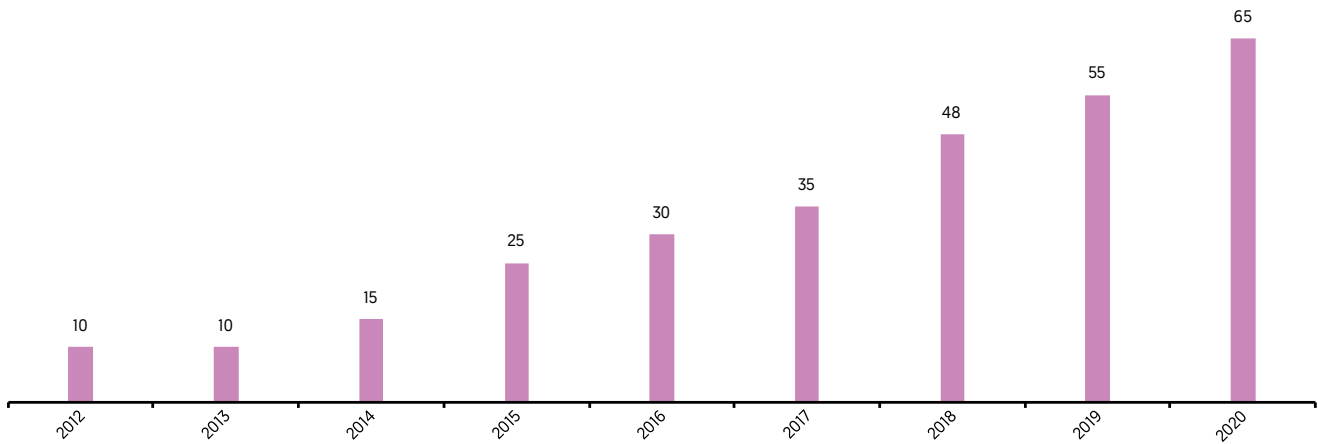
Source: Zenith estimates

Programmatic spend - emerging media channels (€ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Newspapers	-	-	-	-	-	-	-	14	26
Magazines	-	-	-	-	-	-	-	3	6
TV	-	-	-	-	-	-	-	12	24
Radio	-	-	-	-	-	-	-	-	3
Cinema	-	-	-	-	-	-	-	-	-
Outdoor/transport	-	-	-	-	-	-	3	10	17

Source: Zenith

Programmatic share of display advertising spend (%)



The main DSPs in the Finnish market are Google Marketing Platform and Adform. Also operating are Mediamath, Xaxis and Appnexus, although they constitute a much smaller share of the market. Appnexus is the dominant SSP, while Adform and Google have some share.

Programmatic is slowly killing all the direct publisher reservations of display/video and ad networks. Most advertisers are using self-service platforms, which are run by agencies. Generally, the level of knowledge of programmatic trading is good in Finland. Most of the education has been done by the agencies and the IAB.

In the Finnish market, the most commonly placed deals are private deals, private market places and open auction.

All radio and out-of-home publishers are testing programmatic opportunities in very small scale, but the goal is to transform all digital OOH to be bought programmatically. Programmatic TV is challenged by current broadcast technologies, but all TV channels are interested in trying a pilot.

For publishers, the three key drivers are video inventory, viewability and mobile app inventory. Indeed, the biggest challenge at the moment is the lack of video inventory in premium media and in in-stream services.

Forecasts

Advertising spend (€ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total digital	2,551.0	2,643.0	2,911.0	3,076.0	3,322.8	3,753.4	4,272.1	4,808.0	5,359.4
Total display	738.0	753.0	958.0	1,051.0	1,203.8	1,450.4	1,774.6	2,112.1	2,462.8
Banners + other traditional display	636.0	617.0	728.0	742.0	786.8	873.7	996.0	1,115.5	1,227.1
Video	102.0	136.0	230.0	309.0	417.0	576.7	778.5	996.5	1,235.7
Native	-	-	-	-	-	-	-	-	-

Programmatic spend (€ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total programmatic display	52.0	117.0	263.0	423.0	639.0	901.0	1,225.0	1,581.0	1,960.0
Banners + other traditional display	52.0	101.0	208.0	314.0	448.0	569.0	703.1	840.0	989.0
Video	-	16.0	55.0	109.0	191.0	332.0	521.9	741.0	971.0
Native	-	-	-	-	-	-	-	-	-

Programmatic spend by type of deal (€mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Open (RTB)	44.2	87.8	160.4	203.0	249.2	280.7	318.5	395.3	470.4
Private marketplaces	6.2	17.6	47.3	93.1	127.8	153.9	183.8	229.2	274.4
Preferred deals	1.6	11.7	52.6	114.2	236.4	425.6	661.5	869.6	1,097.6
Guaranteed	0.0	0.0	2.6	12.7	25.6	40.7	61.3	87.0	117.6

Top five buy side technology in market

- 1 DBM
- 2 Appnexus
- 3 Amazon AdV. Platform
- 4 Adobe/Tube Mogul
- 5 Trade Desk

Top five sell side vendors in market

- 1 Google Adexchange
- 2 Appnexus
- 3 Rubicon
- 4 Freewheel
- 5 Smart RTB+

Source: Observatoire de l'e-pub SRI/Udecam/Publicis Media

Programmatic share of display advertising spend (%)



Cost by media channel

Average programmatic CPM by media channel (US\$)

	2012	2013	2014	2015	2016	2017	2018
Overall	1.45	1.99	2.25	2.50	4.14	5.66	5.13
Display	1.03	1.07	1.27	1.27	2.15	2.73	2.22
Mobile	1.03	1.07	0.00	4.30	11.93	6.74	13.02
Video	1.41	1.64	8.81	7.70	9.88	10.33	9.98
Social	-	-	-	-	-	-	-

Average programmatic CPC by media channel (US\$)

	2012	2013	2014	2015	2016	2017	2018
Overall	1.16	1.08	1.29	1.16	1.59	1.31	0.89
Display	1.41	1.64	2.07	1.29	1.19	0.71	0.33
Mobile	1.41	1.64	0.00	0.32	1.83	0.72	2.33
Video	0.84	0.82	0.95	1.12	2.00	2.06	2.46
Social	-	-	-	-	-	-	-

Average programmatic CTR by media channel (%)

	2012	2013	2014	2015	2016	2017	2018
Overall	0.13	0.18	0.17	0.22	0.26	0.43	0.58
Display	0.07	0.07	0.06	0.10	0.18	0.39	0.68
Mobile	0.07	0.07	0.00	1.35	0.65	0.94	0.56
Video	0.07	0.07	0.93	0.69	0.49	0.50	0.41
Social	-	-	-	-	-	-	-

Source: Zenith estimates

Nearly all publishers have adopted programmatic trading. The strong growth of programmatic means it constituted 66% of display investment in H1 2018 v. 57% in H1 2017, representing 50% growth in investment overall. This growth is being driven by formats such as IPTV, video, native ads, mobile and, above all, social ads. It is also being helped along by the spread of ad verification and transparency solutions.

Technology is very advanced in the French market, but after a period of experimentation, the tools used are now rationalized. On the sell side, header-bidding technology is a new growth vector. Sales houses have adopted multiple SSPs on video, native and mobile formats. Managed DSP services have almost disappeared because of the relative lack of transparency compared to the open model of the independent trading desks, which are growing very fast.

Preferred deals constitute the most used buying model [54%], ahead of open RTB [26%], private marketplaces [15%] and guaranteed [5%]. The market is now mature and this percentage split is quite steady, with only gentle growth in guaranteed and preferred deals expected.

Addressable TV is forbidden in France for live TV but the government is consulting on the subject and we expect it will be permitted from 2019, albeit with some restrictions for local campaigns (e.g. it may not be possible to indicate local addresses for advertisers). Currently, addressable TV is allowed on OTT (adstitching) but is not very well developed yet except for big sport events or for news channels.

JCDecaux, Clear Channel and Displayce sell some of their digital outdoor inventory programmatically. Meanwhile, programmatic is available on digital radio from NRJ, Spotify, Deezer and Target spot.

Publishers now sell their inventories directly to bypass the ad networks. Technology is now a major asset for them. Demand is strong for premium inventories and header-bidding technology contributes to revenue growth for publishers. Publishers have launched the Digital Ad Trust to reassure advertisers over the problems of brand safety and fraud.

The main driver for future growth is the requirement for transparency. Creating a transparent bid environment will help match true buyer intent and pricing goals with available inventory.

Because the programmatic advertising environment is automated and complex, the adoption of ad verification will bring more clarity.

Programmatic is the future of trading. It will continue to grow on the internet and on all media that have the necessary data, meeting advertisers' demand for better targeting and performance. Some challenges remain: there is the question of whether the market is becoming too concentrated on Facebook and Google, which account for most digital spend growth. Other issues are cost transparency, traceability of inventory and adblocking.

Germany

Forecasts

Advertising spend (€ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total digital	3,749.0	4,150.0	5,282.0	5,804.0	6,367.0	6,791.0	7,346.0	7,862.0	8,362.0
Total display	1,187.0	1,461.0	1,644.0	1,876.0	2,304.0	2,886.0	3,550.0	4,624.0	5,424.7
Banners + other traditional display	1,071.0	1,310.0	1,393.0	1,506.0	1,680.0	1,884.1	1,938.5	2,043.6	1,418.8
Video	116.0	151.0	202.0	257.0	394.0	569.0	795.0	962.0	1,185.0
Native	-	-	49.0	113.0	230.0	432.9	816.5	1,618.4	2,820.8

Programmatic spend (€ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total programmatic display	-	-	271.1	405.4	663.6	1,005.8	1,366.8	1,893.5	2,539.6
Banners + other traditional display	-	-	-	-	504.3	663.8	806.4	965.7	1,145.7
Video	-	-	-	-	92.9	191.1	328.0	568.1	1,012.0
Native	-	-	-	-	66.4	150.9	232.3	359.8	381.9

Programmatic spend by type of deal (€ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Open (RTB)	-	-	181.6	190.5	305.2	281.6	218.7	170.4	152.8
Private marketplaces	-	-	81.3	162.2	298.6	573.3	902.1	1,344.4	1,814.0
Preferred deals	-	-	5.4	40.5	39.8	100.6	177.7	284.0	420.1
Guaranteed	-	-	2.7	12.2	19.9	50.3	68.3	94.7	152.8

Top five buy side technology in market

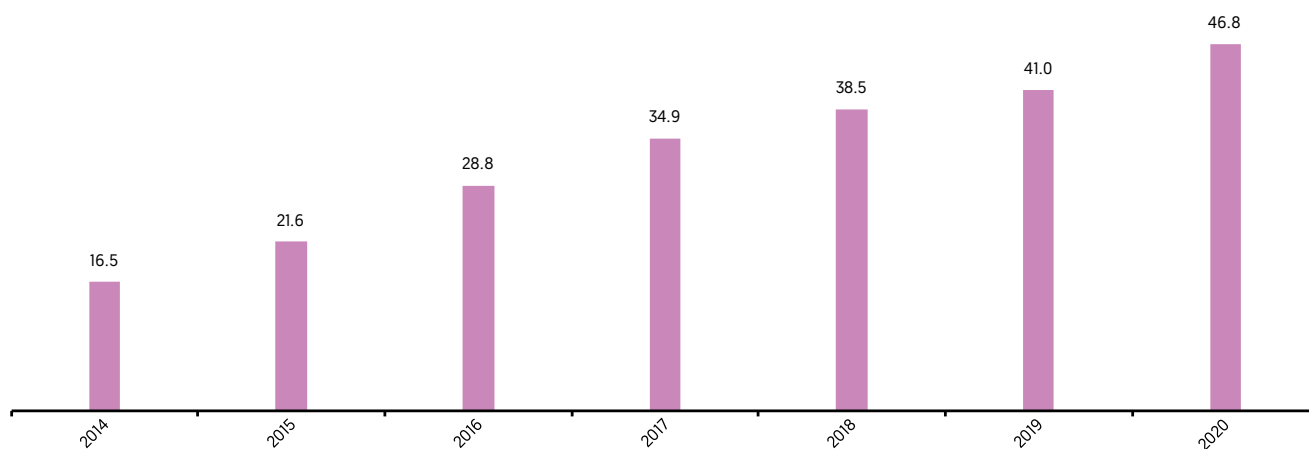
1	DV 360 (DBM)
2	The Trade Desk
3	Amazon Advertising Platform
4	Adara
5	Adobe

Top five sell side vendors in market

1	Double Click Adx
2	Yieldlab
3	SptXchange
4	Smartclip
5	Appnexus

Source: Zenith, DSPs

Programmatic share of display advertising spend (%)



Cost by media channel

Average programmatic CPM by media channel (US\$)

	2012	2013	2014	2015	2016	2017	2018
Overall	1.43	1.60	3.22	5.79	8.76	-	-
Display	1.45	1.67	2.54	5.09	7.86	-	-
Mobile	1.45	1.67	1.00	0.60	0.60	-	-
Video	1.41	1.81	16.49	-	-	-	-
Social	-	-	-	-	-	-	-

Average programmatic CPC by media channel (US\$)

	2012	2013	2014	2015	2016	2017	2018
Overall	1.42	1.56	2.60	3.58	4.00	-	-
Display	1.41	1.81	4.49	6.59	7.08	-	-
Mobile	1.41	1.81	0.27	0.41	0.43	-	-
Video	0.00	0.43	0.58	-	-	-	-
Social	-	-	-	-	-	-	-

Average programmatic CTR by media channel (%)

	2012	2013	2014	2015	2016	2017	2018
Overall	0.101	0.103	0.124	0.16	0.22	-	-
Display	0.10	0.09	0.06	0.08	0.11	-	-
Mobile	0.10	0.09	0.37	0.14	0.14	-	-
Video	0.10	0.09	2.85	-	-	-	-
Social	-	-	-	-	-	-	-

Source: Zenith estimates

In the last year, the market has come to accept programmatic advertising as a standard part of digital advertising strategies. Most clients understand what programmatic is and what it does, and those who do not are eager to learn more. Knowledge of programmatic has increased significantly compared to just a few years ago. Agencies have their own programmatic teams and specialists who have in-depth knowledge of the market. Global companies are driving programmatic growth, which has in turn driven greater interest for programmatic in the whole market, especially on the client side.

The programmatic landscape has all the major DSPs, SSPs and many local solutions that cater to Germany's specific need for greater data safety. Due to data safety concerns, this part of the market has been very slow to develop. Currently, customers are focusing on these topics: ad verification (brand safety, viewability, and ad fraud), data security (GDPR and data privacy), data management platforms and campaign structure (data-based versus content-based approach).

The growth in programmatic can be attributed to two main factors: increased understanding of programmatic on the client side has increased the investment they are willing to make in programmatic advertising, and the willingness of publishers to open up the more valuable inventory, such as online video, has increased the potential budgets that can be invested in programmatic advertising.

The most common deals used are private deals, followed by preferred: both of them are continuously growing - private deals more rapidly, preferred deals at a moderate level. Additionally, guaranteed deals have been growing in popularity, particularly for video campaigns thanks to the improved predictability, availability and quality of video content.

Programmatic advertising is well on the way to becoming fully adopted by the market, especially with the channels and technologies available. With the convergence of video and TV, brands are demanding to understand their video campaigns holistically (across linear TV, mobile, desktop and emerging advanced TV channels such as CTV, OTT, Smart TVs, streaming services etc.).

Forecasts

Advertising spend (HK\$ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total digital	452.0	1,276.0	2,016.0	2,771.0	3,046.0	4,146.0	5,085.0	5,492.0	6,151.0
Total display	429.4	1,186.7	1,874.9	2,521.6	2,741.4	3,731.4	4,525.7	4,887.9	5,474.4
Banners + other traditional display	415.8	1,122.9	1,753.9	2,299.9	2,391.1	3,109.5	3,559.5	3,668.4	3,798.2
Video	13.6	63.8	121.0	194.0	304.6	539.0	813.6	999.8	1,368.6
Native	-	-	-	27.7	45.7	82.9	152.6	219.7	307.6

Programmatic spend (HK\$ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total programmatic display	-	-	60.5	166.3	365.5	787.7	1,271.3	1,647.6	2,152.9
Banners + other traditional display	-	-	60.5	149.6	308.9	622.3	889.9	1,070.9	1,334.8
Video	-	-	-	16.6	54.8	157.5	356.0	494.3	667.4
Native	-	-	-	-	1.8	7.9	25.4	82.4	150.7

Programmatic spend by type of deal (HK\$ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Open (RTB)	-	-	60.5	166.3	347.2	630.2	864.5	939.1	1,076.4
Private marketplaces	-	-	0.0	0.0	18.3	118.2	254.3	411.9	645.9
Preferred deals	-	-	0.0	0.0	0.0	15.8	89.0	164.8	215.3
Guaranteed	-	-	0.0	0.0	0.0	23.6	63.6	131.8	215.3

Top buy side technology in market

1	DV360
2	The Trade Desk
3	AppNexus
4	Oath

Top sell side vendors in market

1	Adex
2	YouTube
3	Oath
4	AppNexus

Source: Zenith

Programmatic share of display advertising spend (%)



Cost by media channel

Average programmatic CPM by media channel (US\$)

	2012	2013	2014	2015	2016	2017	2018
Overall	-	-	0.80	1.37	2.48	3.05	2.61
Display	-	-	0.87	1.35	1.80	2.35	2.61
Mobile	-	-	0.36	-	1.47	-	-
Video	-	-	0.01	13.33	9.92	11.36	0.37
Social	-	-	-	-	-	-	-

Average programmatic CPC by media channel (US\$)

	2012	2013	2014	2015	2016	2017	2018
Overall	-	-	1.00	1.27	1.83	2.31	2.13
Display	-	-	1.26	1.26	1.66	2.59	2.13
Mobile	-	-	0.24	-	0.22	-	-
Video	-	-	-	3.41	4.28	1.82	-
Social	-	-	-	-	-	-	-

Average programmatic CTR by media channel (%)

	2012	2013	2014	2015	2016	2017	2018
Overall	-	-	0.08	0.11	0.14	0.13	0.12
Display	-	-	0.07	0.11	0.11	0.09	0.12
Mobile	-	-	0.15	-	0.66	-	-
Video	-	-	-	0.39	0.23	0.63	30.00
Social	-	-	-	-	-	-	-

The current adoption of programmatic technology mainly focuses on ad servers, exchanges, SSPs and DSPs; there is very limited advertiser investment in DMPs, even amongst multinational companies.

Media agencies and programmatic vendors, together with IAB HK, lead the education of programmatic, so knowledge has been improving. Advertisers are willing to learn so they can improve buying efficiency and integrate sophisticated ad tech stacks; this enables them to communicate with their audience with customized messages.

There are several key drivers behind growth in programmatic in Hong Kong. As well as advertisers now being more educated about the benefits of programmatic buys, the leading local publishers (for example, atnext media and myTVSuper) have progressively adopted and are open to programmatic buys. They are willing to make their premium inventory available programmatically in preferred deals and programmatic guaranteed deals.

One hurdle still to overcome is that the quantity and quality of third party data is limited, but continued adoption from advertisers and local publishers will drive future growth of programmatic.

The trend between managed-service and self-service is gradually shifting towards self-service. However, the use of managed-service buys continues, due to publisher reservation of most premium inventory and the unique data co-op partnership of ad networks (for example, Adara, Sojern, Vpon and Criteo).

Open exchanges and private marketplace are the most common types of deal used in Hong Kong. With the demand of premium inventory and brand safety, advertisers are shifting more budgets from open exchanges to PMPs, and other private deals.

Programmatic advertising is reaching maturity in Hong Kong, so traditional media channels, such as connected TV, audio and digital OOH, are also available programmatically.

Hungary

Forecasts

Advertising spend (HUF mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total digital	32,078	40,332	48,188	54,831	67,145	78,257	84,813	92,013	99,840
Total display	15,028	18,149	20,962	23,243	28,967	34,196	37,274	41,001	45,101
Banners + other traditional display	-	-	-	-	-	-	-	-	-
Video	-	-	-	-	-	-	-	-	-
Native	-	-	-	-	-	-	-	-	-

Programmatic spend (HUF mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total programmatic display	-	-	85	580	1,028	1,822	3,000	5,000	5,700
Banners + other traditional display	-	-	-	-	-	-	-	-	-
Video	-	-	-	-	-	-	-	-	-
Native	-	-	-	-	-	-	-	-	-

Programmatic spend by type of deal (HUF mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Open (RTB)	-	-	85	513	944	1,708	2,500	3,500	4,000
Private marketplaces	-	-	0	67	84	114	500	1,500	1,700
Preferred deals	-	-	0	0	0	0	0	0	0
Guaranteed	-	-	0	0	0	0	0	0	0

Top five buy side technology in market

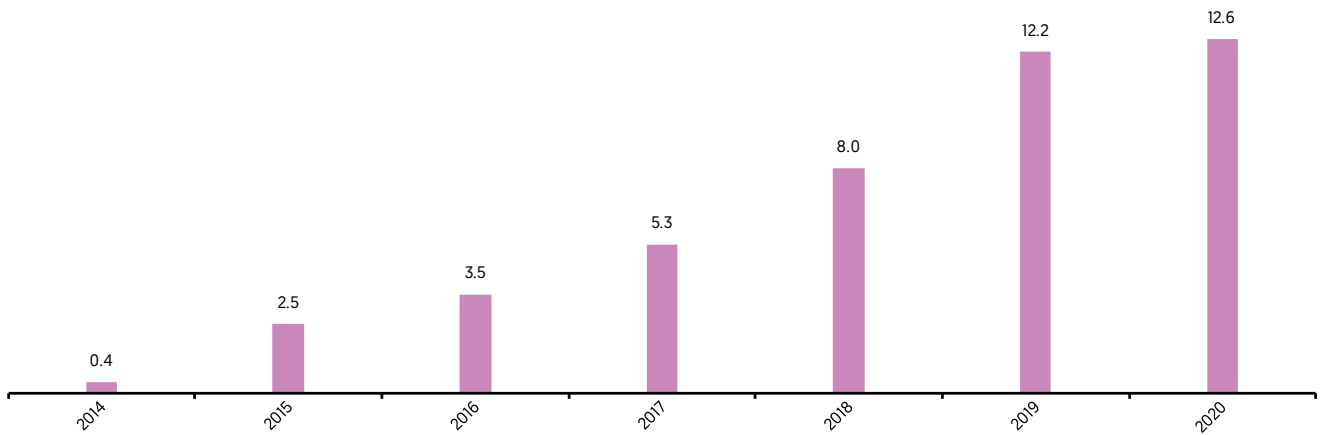
- 1 Doubleclick Bid Manager
- 2 Adform
- 3 Appnexus
- 4 Mediamath
- 5 Rubicon Project

Top five sell side vendors in market

- 1 Rubicon Project
- 2 Adform
- 3 Doubleclick for Publishers
- 4 Appnexus
- 5 Gemius SmartRTB

Source: IAB Hungary, Zenith estimates

Programmatic share of display advertising spend (%)



Programmatic technology has become more popular in Hungary over the past few years, although budgets are still relatively small. Spending increased by 77% in 2017, but it is still at a fairly low level, accounting for only a small percentage of total digital spend. However, we expect further growth in the coming years driven by rising demand, and the increasing availability of new formats, novel deal types and rising volumes of data usage.

Hungary used to be an 'open RTB'-only market. More key agencies and media owners have started to use private marketplace deals, though, and overall growth is being driven by these types of deals.

The Hungarian market leans towards self-service. In terms of biddable media, Google Display and Etarget are still dominant.

Programmatic buying will continue to increase significantly over the next few years as the diversification of inventory formats continues. Education, clear processes and agreed market standards are key for further development. We are not seeing any signs of programmatic becoming available in any traditional media channels soon.

India

Forecasts

Advertising spend (INR mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total digital	10,016	22,034	28,204	36,665	50,530	72,284	97,523	128,730	167,349
Total display	5,621	12,366	15,828	20,756	34,902	43,343	57,538	78,525	97,062
Banners + other traditional display	5,161	10,995	13,040	16,686	25,617	30,578	39,200	54,427	63,117
Video	460	1,371	2,788	4,070	9,285	12,765	18,338	24,098	33,945
Native	-	-	-	-	-	-	-	-	-

Programmatic spend (INR mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total programmatic display	-	-	-	1,691	3,622	5,564	7,929	12,519	21,314
Banners + other traditional display	-	-	-	-	-	-	-	-	-
Video	-	-	-	-	-	-	-	-	-
Native	-	-	-	-	-	-	-	-	-

Top five buy side technology in market

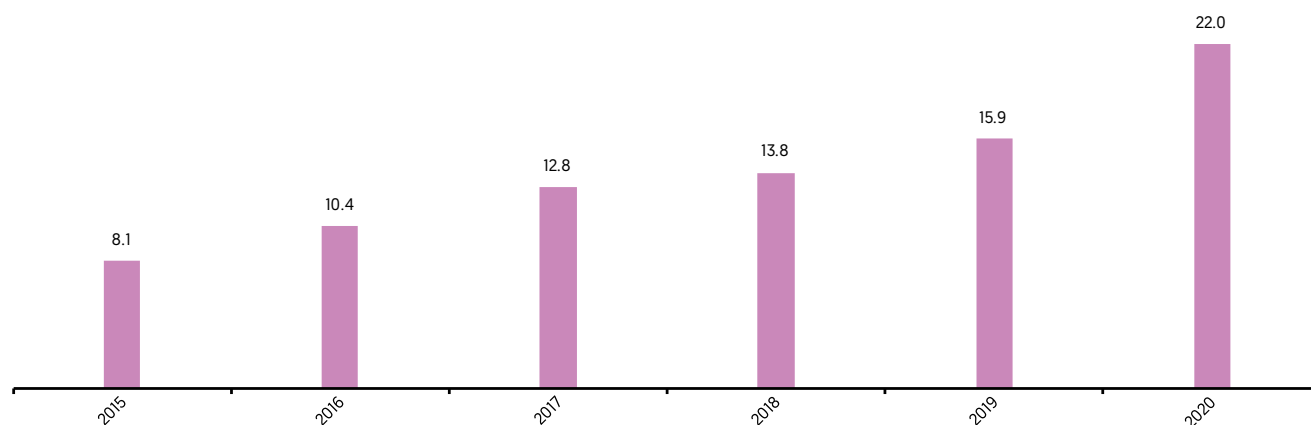
- 1 DV360
- 2 Appnexus
- 3 Mediamath
- 4 Brightroll
- 5 PubMatic

Top five sell side vendors in market

- 1 Double Click Exchange
- 2 Openx
- 3 Rubicon
- 4 Brightroll
- 5 Appnexus

Source: Zenith

Programmatic share of display advertising spend (%)



Cost by media channel

Average programmatic CPM by media channel (US\$)

	2012	2013	2014	2015	2016	2017	2018
Overall	-	-	0.51	0.74	0.80	1.61	0.54
Display	-	-	0.51	0.72	0.54	0.79	0.54
Mobile	-	-	-	0.96	0.70	3.69	3.26
Video	-	-	-	6.86	2.12	4.95	-
Social	-	-	-	-	-	-	-

Average programmatic CPC by media channel (US\$)

	2012	2013	2014	2015	2016	2017	2018
Overall	-	-	0.80	0.67	0.52	0.57	0.13
Display	-	-	0.80	0.71	0.49	0.43	0.13
Mobile	-	-	-	0.25	1.14	0.75	0.26
Video	-	-	-	0.26	0.57	0.71	-
Social	-	-	-	-	-	-	-

Average programmatic CTR by media channel (%)

	2012	2013	2014	2015	2016	2017	2018
Overall	-	-	0.06	0.11	0.15	0.28	0.43
Display	-	-	0.06	0.10	0.11	0.18	0.43
Mobile	-	-	-	0.38	0.06	0.49	1.23
Video	-	-	-	2.68	0.37	0.70	-
Social	-	-	-	-	-	-	-

Source: Zenith estimates

India is among the fastest growing advertising markets in the world. This is partly thanks to the sheer size of the economy, as well as the greater push towards 'Digital India'. With disruptive technologies increasingly becoming part of the advertising sector in the country, programmatic advertising has become a dominant trend.

Advertising is becoming more customer-centric and dynamic. Until a few years ago, ad space was being booked manually, which entailed painstaking meetings, hierarchical bottlenecks, and extended negotiations. With the number of publishers multiplying overnight, it became impossible for advertisers to keep pace with supply. It was obvious for automation to intervene and take control. Programmatic advertising has made life easier for advertisers by:

- Cutting out middlemen and simplifying the process
- Making ads more target-oriented by using data for audience profiling
- Giving a better ROI

The current penetration of programmatic in India is around 14%, and one of the drivers of this growth is programmatic guaranteed. Typically, when people look at programmatic

from a publisher's perspective, they look at premium inventories like the homepage, masthead or a premium video. Usually publishers are not keen to put that in the programmatic environment because they want a fixed price and a guaranteed volume. Programmatic guaranteed allows publishers to trade the price and have a guaranteed volume with an agency. Moreover, it has replaced the manual process with an automated one and brought efficiency.

Google and agencies are the main suppliers of programmatic education in the Indian market. Clients want to use it to help increase media efficiency by 15%-20%. Advertisers are currently using it for branding purposes only. One of the biggest barriers is transparency; most of the time agencies are not giving access to advertisers.

Big advertisers have invested in their own tech, and have moved all their budgets to programmatic. They understand the power of it, and how to use it properly for creative personalization and effective audience buying.

Programmatic is going to be a game changer in India over the next few years, with better fraud detection and automation policies.

Top five buy side technology in market

- 1 Google
- 2 The Trade Desk
- 3 AppNexus
- 4 Videology
- 5 MediaMath

Top sell side vendors in market

- 1 Doubleclick Ad Exchange
- 2 Rubicon
- 3 BidSwitch

Source: Core Media

Google continues to be the most commonly used ad server technology by agencies and publishers in Ireland. A similar trend exists for DSPs and SSPs in that Google is the preferred technology, with most adopting a single platform approach.

DSP theTradeDesk's popularity has increased significantly over the past 12 months, while Videology and Amobee remain the preferred video DSP for most agencies.

There are still very few publishers or clients in this market who have invested in DMP technology, though. This is down to the scale of the market, and the limited ROI most brands get from a DMP in a smaller market.

Programmatic continues to grow in Ireland, driven by increased private marketplace activity, a continuing push towards programmatic guaranteed versus traditional direct buying, and the adoption of other media (mainly audio).

The biggest trend affecting growth within the publisher community is a lack of support for non-standard and custom creative formats.

Each agency holding group within Ireland has a different way of managing its trading desks and programmatic spending. Some opt to use a combination of self-service and managed services, while others only use programmatic for display and/or small amounts of video. Managed services are being used in cases where agencies have not invested fully in their trading desks or under-resourcing.

In terms of type of deal, again different trading desks have different setups within Ireland. Some only trade in the open

exchange and/or buy programmatic guaranteed. Others don't buy any programmatic guaranteed at all, and fully use the open exchange and private marketplaces. Private marketplace and programmatic guaranteed have seen the biggest growth in 2018.

Programmatic knowledge has improved greatly over the past 12 months. With brand safety issues putting a sharper focus on programmatic, it has provided us with an opportunity to further educate our clients on the policies, procedures and functionality of the technology we use to protect them online. IAB also hosted a number of events to help educate the market in late 2017/early 2018.

The need for training will continue into 2019 and beyond, as advancements in programmatic technology continue.

There is still very little adoption of programmatic within traditional media apart from TV (Sky AdSmart) and radio. Virgin Media announced a strategic partnership with Sky in 2017 to bring AdSmart to both Sky and Virgin TV platforms, but this offering has yet to launch.

The larger OOH companies continue to be apprehensive, based on the investment needed for more digital screens and the technology needed to buy and sell media. Smaller more niche offerings specialising in DOOH have made bigger strides, with live tests planned for Q4 2018.

Radio - or audio - has seen the biggest growth in 2018, with Spotify and podcasts leading the way. A recent audio exchange launch from Ireland's largest commercial broadcaster will further cement this growth.

Advertising spend (€ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total digital	1,438.3	1,586.9	1,709.5	1,838.0	1,982.6	2,138.6	2,287.5	2,421.5	2,574.9
Total display *	894.9	1,014.9	1,051.5	1,133.9	1,237.6	1,341.5	1,466.5	1,588.1	1,729.0
Banners + other traditional display	755.2	793.1	807.2	851.5	859.0	890.6	893.5	904.1	911.4
Video	139.7	221.8	244.2	282.4	378.6	450.8	572.9	684.0	817.5
Native	-	-	-	-	-	-	-	-	-

Programmatic spend (€ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total programmatic display	7.1	42.2	91.4	191.4	260.3	361.8	470.3	564.4	666.0
Banners + other traditional display	6.8	37.5	74.0	136.5	182.2	231.5	282.2	310.4	346.0
Video	0.3	4.8	17.4	54.9	78.1	130.2	188.1	254.0	320.0
Native	-	-	-	-	-	-	-	-	-

Programmatic spend by type of deal (€ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Open (RTB)	7.1	40.6	73.1	134.0	156.2	217.1	235.2	254.0	266.4
Private marketplaces	0.0	1.7	16.4	45.9	70.3	72.4	75.3	90.3	99.9
Preferred deals	0.0	0.0	1.8	7.7	20.8	36.2	84.7	107.0	133.2
Guaranteed	0.0	0.0	0.0	3.8	13.0	36.2	75.3	112.9	166.5

Top five buy side technology in market

- 1 Display & Video 360 (DBM)
- 2 Brightroll
- 3 Sizmek
- 4 The Trade Desk
- 5 Amazon

Top five sell side vendors in market

- 1 Authorized Buyers (Adex)
- 2 Rubicon
- 3 Freewheel
- 4 Appnexus
- 5 PubMatic

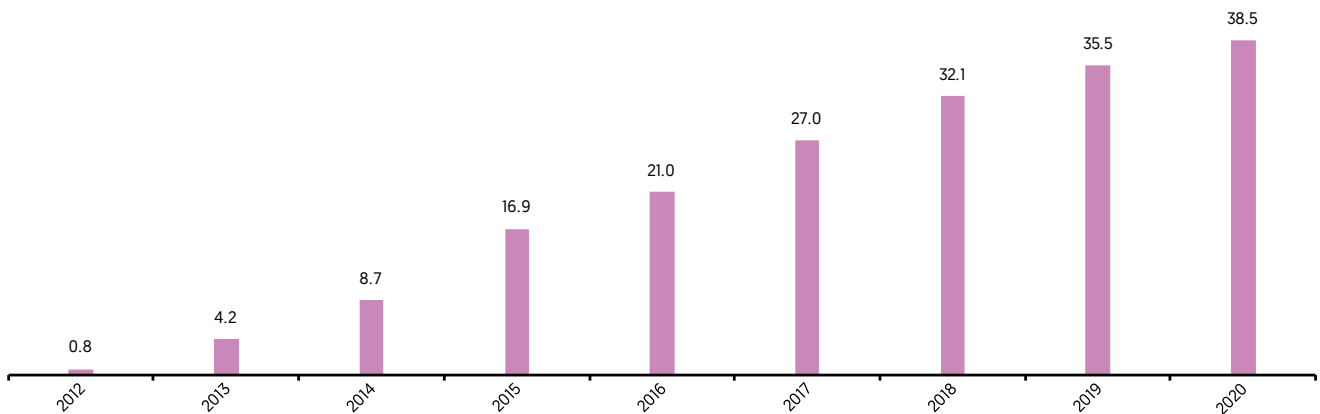
Source: Zenith, Politecnico, eMarketer
* Includes classified

Programmatic spend - emerging media channels (€ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Newspapers	-	-	-	-	-	-	-	-	-
Magazines	-	-	-	-	-	-	-	-	-
TV	-	-	-	-	-	-	-	-	-
Radio	-	-	-	-	-	-	4.6	4.7	4.8
Cinema	-	-	-	-	-	-	-	-	-
Out-of-Home	-	-	-	-	-	-	1.8	3.7	5.5

Source: Zenith

Programmatic share of display advertising spend (%)



Cost by media channel

Average programmatic CPM by media channel (US\$)

	2012	2013	2014	2015	2016	2017	2018
Overall	0.77	1.28	1.79	3.27	4.01	3.19	1.02
Display	0.63	0.68	1.19	2.19	2.78	2.20	0.95
Mobile	0.63	0.68	1.50	2.01	1.79	0.98	-
Video	0.85	0.90	12.12	10.54	11.14	9.78	13.62
Social	-	-	-	-	-	-	-

Average programmatic CPC by media channel (US\$)

	2012	2013	2014	2015	2016	2017	2018
Overall	0.93	0.96	0.87	1.26	1.77	1.81	1.31
Display	0.85	0.90	1.53	2.49	1.84	1.91	1.28
Mobile	0.85	0.90	0.50	0.80	0.78	0.45	-
Video	1.62	1.03	0.52	0.75	1.82	1.74	1.94
Social	-	-	-	-	-	-	-

Average programmatic CTR by media channel (%)

	2012	2013	2014	2015	2016	2017	2018
Overall	0.08	0.13	0.20	0.26	0.23	0.18	0.08
Display	0.07	0.08	0.08	0.09	0.15	0.12	0.07
Mobile	0.07	0.08	0.30	0.25	0.23	0.22	-
Video	0.07	0.08	2.35	1.41	0.61	0.56	0.70
Social	-	-	-	-	-	-	-

Source: Zenith estimates

The Italian market is still dominated by Google in terms of programmatic technologies, both on the DSP and SSP side. But there are other important players, which are gaining relevance in terms of ad spending and market share. Key global players, such as Brightroll and Amazon, are also expanding within the Italian market.

An increasing number of clients now have their own DMP technologies, and the three main global players are Oracle, Adobe and Salesforce.

Media agencies have built up strong internal knowledge on programmatic, by training existing teams and by onboarding dedicated and specialised professionals. This means they can better satisfy the needs of clients.

Growth in programmatic trading has partially been driven by the pull of more mature markets, as international players have entered the Italian market and pushed new technological solutions for efficiency.

On the local side, programmatic is growing because it allows more budget control, better KPIs and a higher return on investment. Clients are aware of this, so they are moving budgets into programmatic.

In general, the global programmatic players are choosing to use market technologies instead of full service. Self-service platforms allow budget monitoring, platform control and

more economic sensitivity. In addition, they can optimize the planning process, saving hours dedicated to managing pure planning activities.

In Italy, most deals are still delivered in open market, but the contribution of private marketplaces is increasing, together with guaranteed deals. By distributing budgets across deals, there is the possibility to diversify strategies, address and monitor KPIs, and satisfy client needs by reaching target audiences, depending on the campaign objectives.

The market evolution on the publisher side of programmatic is complete. A few years ago the big 'institutional' publishers (i.e. those with a traditional media background, such as TV and printed press) approached the programmatic arena with difficulty; this was due to the control of CPM, which is not fixed as it is for traditional buying. However, now all of them use data and technology to push their inventory.

When looking at the differentiation between direct and programmatic, we can see how some formats still need to be bought in a traditional way because of their nature (for example, to guarantee exclusivity on the page).

Addressable TV, DOOH and radio are taking their first steps in programmatic sales; inventory for these media is increasing.

Over the next five years, we think programmatic will become the new normal.

Kazakhstan

There is growing interest in programmatic, mostly at the behest of global clients who perceive it to be an essential part of their campaigns, depending on the segmentation of the audience. Because of the relatively low volume of traffic in Kazakhstan, Russian analogues are very expensive. Knowledge of programmatic trading is still at a low level and some clients are wary of a possible lack of transparency.

Due to the lack of information about programmatic instruments, agencies and clients began by using managed services, and then started to manage campaigns by themselves. RTB is the most common deal type.

Latvia

Forecasts

Advertising spend (€ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total digital	10.9	10.2	10.7	14.7	15.8	18.2	18.8	19.6	20.5
Total display	-	-	-	-	-	15.5	15.8	16.3	16.8
Banners + other traditional display	-	-	-	-	-	10.9	10.5	10.6	10.5
Video	-	-	-	-	-	3.6	4.3	4.7	5.3
Native	-	-	-	-	-	0.9	0.9	1.0	1.0

Programmatic spend (€ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total programmatic display	-	-	-	-	-	5.0	5.8	6.8	8.4
Banners + other traditional display	-	-	-	-	-	3.0	3.2	3.6	4.4
Video	-	-	-	-	-	1.5	2.2	2.6	3.2
Native	-	-	-	-	-	0.5	0.5	0.6	0.8

Programmatic spend by type of deal (€ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Open (RTB)	-	-	-	-	-	4.2	4.8	5.5	6.6
Private marketplaces	-	-	-	-	-	0.2	0.3	0.4	0.6
Preferred deals	-	-	-	-	-	0.1	0.2	0.3	0.4
Guaranteed	-	-	-	-	-	0.4	0.5	0.7	0.9

Top buy side technology in market

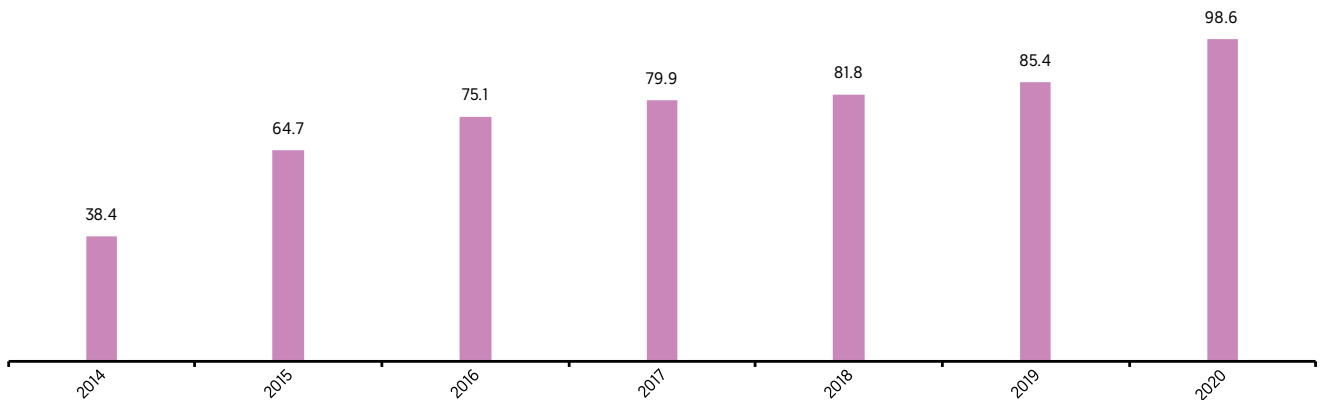
1	Adfrom
2	Google Ads [Google Display & Video]

Top sell side vendors in market

1	Google Ad Manager
2	Adform

Source: Zenith

Programmatic share of display advertising spend (%)



The Baltic markets are quite small, and programmatic technology hasn't gained momentum here yet. The most popular precision buying platforms are Facebook and Google Ads, and their functionality covers the needs of most local advertisers.

With regards to DSP technologies, the main players are Adform and Google Ads/Google Display & Video 360 [formerly DoubleClick Bid Manager].

Under pressure from the 'big 2', local players are developing their own algorithmic buying solutions. In Latvia, the biggest player in the programmatic market is Baltic ADX, which sells the inventory of top local publishers via AppNexus ad tech.

There has been an increase in programmatic adspend among our clients, and we think there are several factors that will lead to market growth:

- Pressure from the HQ's of global/international clients
- Lower prices in comparison with direct buys
- Possibility to target ads more precisely, and use retargeting scenarios

But there is a lack of education around programmatic, and ad tech may not be fully applied in local markets.

GDPR was perceived as one of the biggest threats to programmatic and personalized advertising, but there have been no dramatic changes so far.

Open auction is the most popular type of deal as clients are still very price sensitive when it comes to programmatic. Direct buys via programmatic pipelines are not very popular because they incur additional ad tech costs, which may be eliminated by simply using direct buying.

YouTube and other global vendors do not offer reservation buys.

Self-service platforms are becoming more popular. Managed service is not used for global players, at least among agencies, because it makes an agency price proposal non-competitive for the market. However, managed service remains when buying through ad networks, which still have agency retro-bonus systems.

Within the publisher community, the key drivers are still Google and Facebook, which are taking share of the market from local players.

Programmatic buying of TV, radio and OOH is not available in Latvia, and there are no signs that publishers of traditional media are keen to give away their inventory to third party platforms.

Over the next five years, programmatic will continue its growth in Latvia. New smart and connected devices - wearables, home assistants and the Internet of Things - will enter the mass market. The lines between traditional and online media will become blurred.

Lithuania

Forecasts

Advertising spend (€ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total digital	13.1	18.8	23.5	34.0	50.0	58.4	66.6	73.1	79.5
Total display	11.0	13.0	16.1	20.4	26.0	30.4	32.7	35.8	38.9
Banners + other traditional display	10.0	11.3	13.3	15.3	18.0	20.2	21.3	23.4	25.4
Video	1.1	1.7	2.8	5.1	8.0	10.2	11.3	12.4	13.5
Native	-	-	-	-	-	-	-	-	-

Programmatic spend (€ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total programmatic display	-	-	-	-	-	7.1	10.3	13.7	17.5
Banners + other traditional display	-	-	-	-	-	5.8	7.5	9.4	11.4
Video	-	-	-	-	-	1.3	2.8	4.3	6.1
Native	-	-	-	-	-	-	-	-	-

Programmatic spend by type of deal (€ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Open (RTB)	-	-	-	-	-	6.1	8.5	11.1	14.0
Private marketplaces	-	-	-	-	-	0.2	0.4	0.5	0.7
Preferred deals	-	-	-	-	-	0.5	0.9	1.3	1.8
Guaranteed	-	-	-	-	-	0.3	0.5	0.8	1.1

Top buy side technology in market

- 1 Adform DSP
- 2 Google Ads, Google Display & Video [formerly Doubleclick Bid Manager]

Top five sell side vendors in market

- 1 Delfi.lt
- 2 15min.lt
- 3 Lrytas.lt
- 4 Adnet group
- 5 VisaLietuva.lt

Source: TNS, Zenith

Programmatic share of display advertising spend (%)



Programmatic technology has not yet gained momentum here in Lithuania because of the country's relatively small population. The most popular precision-buying platforms are Facebook and Google Ads, whose functionality covers the needs of most local advertisers.

The key factors in programmatic's growth have been pressure from international clients and local start-ups moving into other markets. There is no problem with accessing modern DSP technologies, the main players in the Baltics being Adform and Google Ads/Google Display & Video [formerly DoubleClick Bid Manager].

To try to compete with the big two, local players are also developing their own algorithmic buying solutions. In Lithuania the key player is Delfi Group, which recently launched its own DMP and is investing in development of AdNet – the biggest local display and video advertising network.

Self-service platforms are getting more and more popular. Managed service isn't used for global players, at least among agencies, because it makes an agency price proposal non-competitive for the market or totally kills the revenue. However, managed services are still offered when buying through ad networks that still have agency retro-bonus systems.

The rise of interest in Baltic markets among global players such as Google and Facebook is tangible. Google has hired more people to work supporting Baltic clients and agencies; Facebook has also started to provide a manager for the big spenders.

Open auction is the most popular type of deal since clients are still very price-sensitive when it comes to programmatic. Direct buys via programmatic pipelines aren't very popular because they imply additional ad tech costs, which may be eliminated by simply using direct buying.

Malaysia

Forecasts

Advertising spend (RM mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total digital	202.7	233.1	841.5	1,051.9	1,314.8	1,578.0	1,915.0	2,260.0	2,599.0
Total display	-	-	462.0	499.0	610.0	823.0	1,044.0	1,164.3	1,280.7
Banners + other traditional display	-	-	304.9	319.4	366.0	461.0	584.6	628.7	666.0
Video	-	-	73.9	89.8	146.4	247.0	334.1	395.9	448.3
Native	-	-	83.2	89.8	97.6	115.0	125.3	139.7	166.5

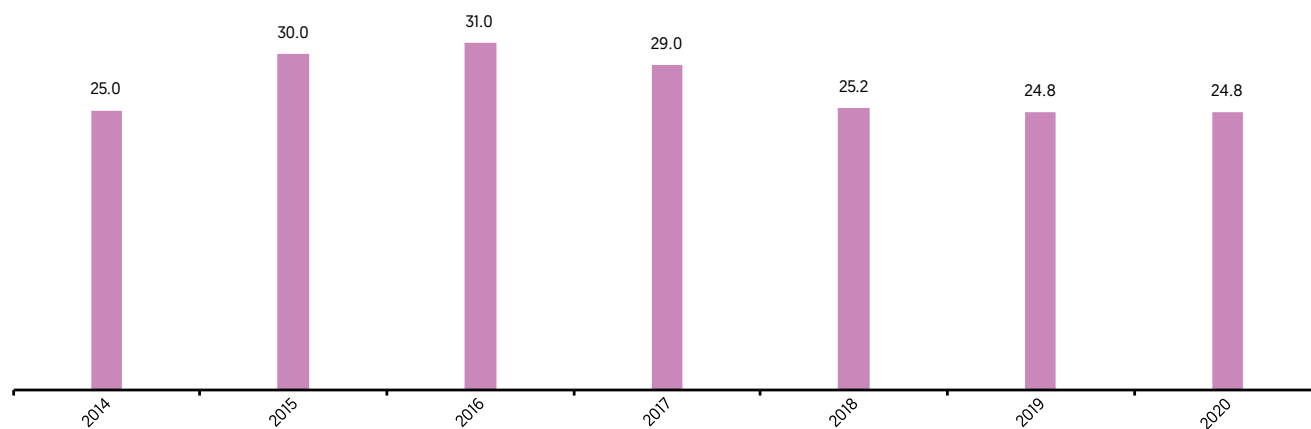
Programmatic spend (RM mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total programmatic display	-	-	115.5	149.7	189.1	238.7	262.9	289.2	318.1
Banners + other traditional display	-	-	76.2	92.8	113.5	138.4	147.2	159.1	175.0
Video	-	-	18.5	26.9	45.4	69.2	86.8	101.2	111.3
Native	-	-	20.8	29.9	30.3	31.0	28.9	28.9	31.8

Programmatic spend by type of deal (RM mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Open (RTB)	-	-	113.2	146.7	179.6	224.3	236.6	251.6	264.0
Private marketplaces	-	-	0.0	0.0	1.9	4.8	10.5	17.4	25.4
Preferred deals	-	-	0.0	0.0	1.9	2.4	5.3	8.7	12.7
Guaranteed	-	-	2.3	3.0	5.7	7.2	10.5	11.6	15.9

Programmatic share of display advertising spend (%)



Cost by media channel

Average programmatic CPM by media channel (US\$)

	2012	2013	2014	2015	2016	2017	2018
Overall	-	-	0.60	1.02	1.55	1.42	2.31
Display	-	-	0.60	1.02	1.18	1.20	1.56
Mobile	-	-	0.45	-	-	4.26	-
Video	-	-	-	-	7.00	11.25	7.11
Social	-	-	-	-	-	-	-

Average programmatic CPC by media channel (US\$)

	2012	2013	2014	2015	2016	2017	2018
Overall	-	-	0.43	1.03	1.36	0.68	1.05
Display	-	-	0.43	1.03	1.15	0.57	1.80
Mobile	-	-	0.39	-	-	2.46	-
Video	-	-	-	-	2.46	1.36	0.66
Social	-	-	-	-	-	-	-

Average programmatic CTR by media channel (%)

	2012	2013	2014	2015	2016	2017	2018
Overall	-	-	0.14	0.10	0.11	0.21	0.22
Display	-	-	0.14	0.10	0.10	0.21	0.09
Mobile	-	-	0.11	-	-	0.17	-
Video	-	-	-	-	0.28	0.83	1.07
Social	-	-	-	-	-	-	-

Source: Zenith estimates

Expansion into programmatic technology has been instrumental not just to agencies, but for clients and publishers as well. As ad tech stacks gets more user friendly, more and more clients have been adopting programmatic tech in-house.

The key factor for growth is accessibility. Programmatic used to be a little intimidating for clients, but simplified dashboards have demystified the process considerably.

While managed service remains the preferred method, there has been a significant rise in self-service models, which allow traders to maximise efficiency between different DSPs and ad networks.

Direct deals are still the most common method of working. That said, there has been a rise in PMP offerings in a bid to take away some control from the bigger giants like Facebook and Google.

Transparency and accountability are key for all agencies and clients. But due to there being such a decentralised network of ad placement, questions of brand safety and fraud prevention have become problematic for programmatic vendors.

One place programmatic can play a crucial role is in TV. Vying for the consumer's attention is everywhere in a market characterised by multiscreening behaviour, and TV-synched programmatic solutions will ultimately find its niche.

Forecasts

Advertising spend (Leu mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total digital	19.4	29.6	38.8	56.4	72.8	79.1	95.0	109.2	120
Total display	-	-	-	-	-	-	-	-	-
Banners + other traditional display	-	-	-	-	-	-	-	-	-
Video	-	-	-	-	-	-	-	-	-
Native	-	-	-	-	-	-	-	-	-

Programmatic spend (Leu mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total programmatic display	-	-	-	-	0.1	1.1	1.7	2.6	3.4
Banners + other traditional display	-	-	-	-	0.1	0.3	0.7	1.0	1.5
Video	-	-	-	-	0.1	0.8	1.0	1.4	1.7
Native	-	-	-	-	-	-	-	0.1	0.3

Programmatic spend by type of deal (Leu mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Open (RTB)	-	-	-	-	0.1	1.1	1.6	2.3	2.7
Private marketplaces	-	-	-	-	0.0	0.0	0.0	0.0	0.0
Preferred deals	-	-	-	-	0.0	0.0	0.0	0.0	0.0
Guaranteed	-	-	-	-	0.0	0.0	0.1	0.3	0.7

Top buy side technology in market

- 1 Google Marketing Platform

Top five sell side vendors in market

- 1 Google
- 2 Numbers
- 3 MyTarget
- 4 Facebook
- 5 NovaWeb

Source: Zenith

At the moment, the only platform in Moldova is the Google Marketing Platform. Admixer Trade Desk should be launched by the end of the year; it has been developed in Ukraine, with a customized approach for our market.

There is a lack of knowledge about programmatic due to the lack of platforms and the small number of specialists in the field.

However, the number of programmatic campaigns is growing. There are several reasons behind this growth:

- The quantity of available inventory
- Lower costs than on other platforms
- Larger and more precise coverage of the audience
- Complete integration of planning, launching and reporting tools

The most common type of deal used is open [RTB].

We think that in five years, Moldova will have reached the current state of programmatic in developed markets. Over the past year, there has been a boom in e-commerce platform launches. As mentioned above, one of the main barriers to adoption is the lack of knowledge, and due to the small volume of the market, players like Google are not interested in organizing events in order to promote it and educate people. But we may see a rise in adoption as a result of regional built DSPs, for whom markets such as ours are a good opportunity to test their platforms and gain some business, especially given the absence of interest from Google.

Forecasts

Advertising spend (€ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total digital	1,158	1,255	1,397	1,491	1,649	1,784	2,067	2,317	2,578
Total display	476	520	582	606	649	685	817	898	979
Banners + other traditional display	424	463	507	473	480	480	564	611	656
Video	52	57	75	95	117	154	188	211	240
Native	-	-	-	38	52	51	65	76	83

Programmatic spend (€ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total programmatic display	75	104	144	187	224	263	292	315	330
Banners + other traditional display	74	101	137	168	188	205	213	230	241
Video	1	3	6	17	34	55	73	79	83
Native	-	-	1	2	2	3	6	6	7

Programmatic spend by type of deal (€ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Open (RTB)	59	81	114	144	159	157	154	166	174
Private marketplaces	8	11	17	22	40	81	95	103	108
Preferred deals	-	-	-	-	-	-	-	-	-
Guaranteed	9	11	13	21	25	25	43	46	49

Top five buy side technology in market

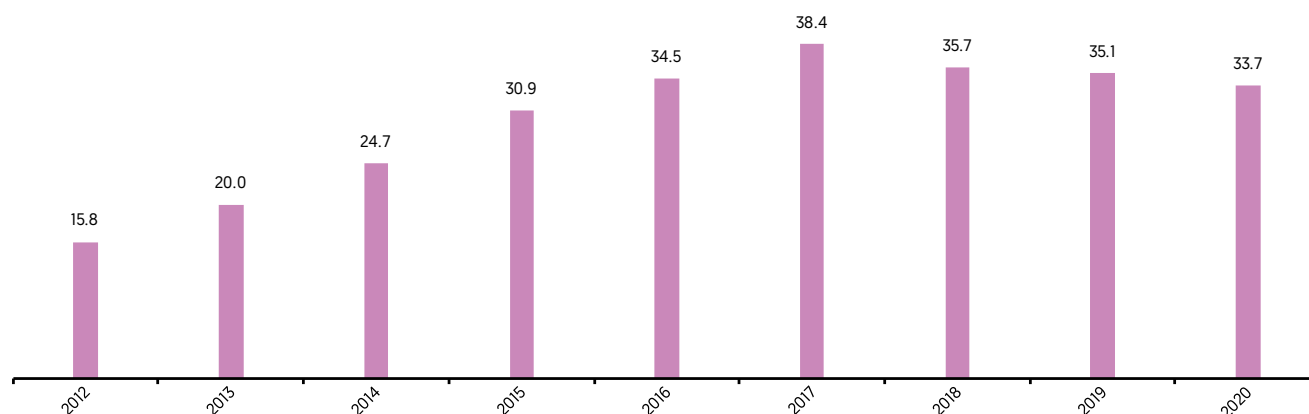
1	DV 360 (former DBM)
2	Mediamath
3	Adform
4	The Trade Desk
5	AppNexus

Top five sell side vendors in market

1	Google Admanager (former Adx)
2	AppNexus
3	Improve Digital
4	SpotX
5	Rubicon

Source: IAB, Zenith

Programmatic share of display advertising spend (%)



Cost by media channel

Average programmatic CPM by media channel (US\$)

	2012	2013	2014	2015	2016	2017	2018
Overall	1.55	1.48	3.29	4.85	6.63	7.69	7.70
Display	1.55	1.55	3.32	3.59	3.93	4.51	5.53
Mobile	1.55	1.55	1.75	2.43	3.62	5.46	6.87
Video	2.37	1.43	12.75	16.68	15.81	15.07	15.92
Social	-	-	-	-	-	-	-

Average programmatic CPC by media channel (US\$)

	2012	2013	2014	2015	2016	2017	2018
Overall	2.37	1.21	2.21	1.82	3.05	3.88	3.86
Display	2.37	1.43	3.52	3.34	2.75	2.98	3.22
Mobile	2.37	1.43	0.86	0.68	1.48	3.21	-
Video	-	-	0.72	1.83	3.63	4.90	5.25
Social	-	-	-	-	-	-	-

Average programmatic CTR by media channel (%)

	2012	2013	2014	2015	2016	2017	2018
Overall	0.07	0.12	0.15	0.27	0.22	0.20	0.20
Display	0.07	0.11	0.09	0.11	0.14	0.15	0.17
Mobile	0.07	0.11	0.20	0.35	0.25	0.17	-
Video	0.07	0.11	1.78	0.91	0.44	0.31	0.30
Social	-	-	-	-	-	-	-

Source: Zenith estimates

The current adoption of programmatic technology in the Netherlands is very high. The most popular ad servers are Google Campaign manager and Sizmek. Google has also increased its share of the SSP market, likely due to good integration with other Google products and GDPR regulation. Local SSP Improve Digital is still going strong, however. DV 360 dominates the DSP market, but there is competition between other providers like Adform, Mediamath and The Trade Desk.

There has been only a slight increase in DMP adoption as platform cost versus market scale/budget is still high.

Managed service by DSPs is not common any more. Most agencies have their programmatic services in-house. There has also been a continuation of the trend of large advertisers building direct relationships with tech vendors as a first step to take programmatic in-house.

Private deals and preferred deals are the most common types used in the Netherlands. Publishers are increasingly adding their own data segments to these types of deal to add value. Programmatic guaranteed is slowly making its way into the market as well.

In the publisher community, more and more publishers are moving towards header bidding. Marktplaats and Persgroep (major Dutch publishers) moved to header bidding earlier this year, and Sanoma will start moving to header bidding next month. Most publishers are combining header bidding with a first price auction model.

There is a large gap between advertisers that are well informed about programmatic and ad tech, and those that have very limited knowledge. On both sides, however, we see a big appetite for more knowledge. Education is mainly led by industry bodies (for example, the IAB), tech vendors and agencies.

There is still growth in programmatic, but the rate of growth is now slower than in recent years. The shift in budgets from traditional buying to programmatic buying has mostly been for display and video, but in the future, we can expect more growth from audio, DOOH and TV; as in many markets, traditional media vendors have been slow to adopt programmatic technology.

In terms of barriers to growth, GDPR is an ongoing issue and e-privacy regulation will become effective in 2019.

New Zealand

Forecasts

Advertising spend (NZD mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total digital	366.0	471.0	589.0	694.0	870.0	785.0	824.0	900.0	990.0
Total display	114.0	136.0	140.0	167.0	194.0	181.0	190.0	207.0	228.0
Banners + other traditional display	114.0	134.6	137.2	157.5	159.7	148.6	153.3	164.0	180.6
Video	-	1.4	2.8	6.7	29.1	25.3	28.5	33.1	36.5
Native	-	-	-	2.8	5.2	7.1	8.2	9.9	10.9

Programmatic spend (NZD mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total programmatic display	2.3	4.1	5.6	6.7	29.1	72.4	85.5	103.5	114.0
Banners + other traditional display	2.3	4.0	5.5	6.4	24.6	60.9	71.8	85.8	94.5
Video	-	0.04	0.1	0.3	4.4	10.9	12.8	16.6	18.2
Native	-	-	-	0.03	0.2	0.7	0.9	1.1	1.3

Programmatic spend by type of deal (NZD mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Open (RTB)	2.3	4.1	5.3	6.2	25.0	57.9	65.8	76.6	84.4
Private marketplaces	0.0	0.0	0.3	0.1	3.0	7.2	9.4	12.4	13.7
Preferred deals	0.0	0.0	0.0	0.3	1.5	5.1	6.8	9.3	10.3
Guaranteed	0.0	0.0	0.0	0.1	0.9	2.2	3.4	5.2	5.7

Top five buy side technology in market

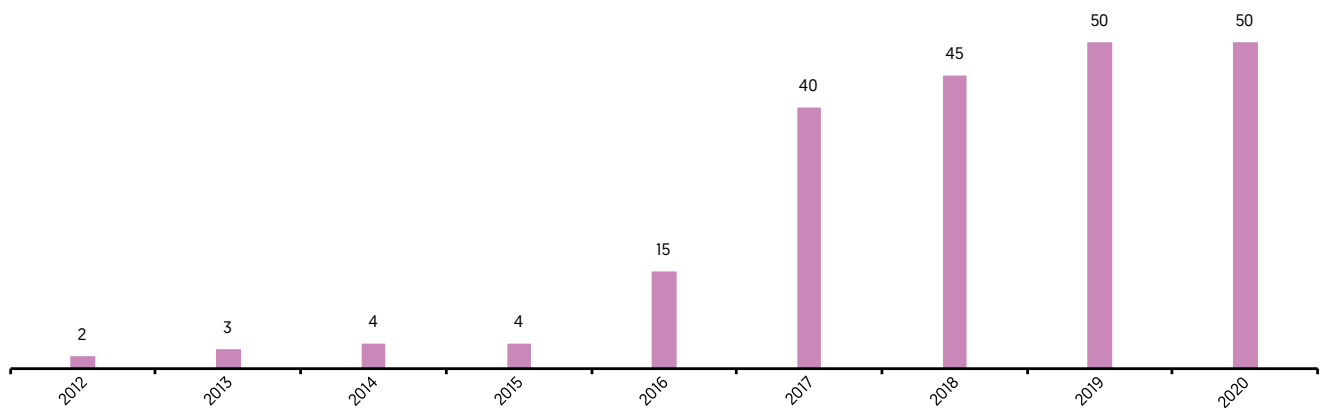
- 1 Display & Video 360
- 2 Media Math
- 3 Trade Desk
- 4 Adform
- 5 Oath

Top five sell side vendors in market

- 1 Google Ad Manager
- 2 Appnexus
- 3 Telar
- 4 Rubicon
- 5 PubMatic

Source: Zenith

Programmatic share of display advertising spend (%)



Cost by media channel

Average programmatic CPM by media channel (US\$)

	2012*	2013*	2014	2015	2016	2017	2018
Overall	1.64	1.63	1.99	3.17	5.38	9.73	8.61
Display	1.61	1.48	1.63	2.67	3.86	4.33	3.29
Mobile	0.50	0.75	1.49	1.23	3.26	3.42	4.86
Video	21.24	17.88	14.01	21.92	19.14	15.76	13.67
Social	-	-	15.39	-	-	-	-

Average programmatic CPC by media channel (US\$)

	2012*	2013*	2014	2015	2016	2017	2018
Overall	2.36	2.16	1.85	2.50	4.01	3.96	5.52
Display	2.60	3.19	4.47	3.52	5.74	4.52	6.63
Mobile	0.28	0.23	0.46	0.48	2.14	2.01	6.61
Video	0.36	1.03	0.63	1.73	3.72	4.02	5.29
Social	-	-	0.99	-	-	-	-

Average programmatic CTR by media channel (%)

	2012*	2013*	2014	2015	2016	2017	2018
Overall	0.07	0.08	0.11	0.13	0.13	0.25	0.16
Display	0.06	0.05	0.04	0.08	0.07	0.10	0.05
Mobile	0.18	0.32	0.32	0.26	0.15	0.17	0.07
Video	1.56	1.73	2.21	1.27	0.52	0.39	0.26
Social	-	-	1.55	-	-	-	-

Source: Zenith estimates

In New Zealand, most agencies and clients use Google's Campaign Manager to ad serve campaigns. A natural extension through the Google tech stack sees most use Display & Video 360 as their primary DSP. As the market develops, we are seeing increasing competition from Media Math, theTradeDesk, Adform and Oath.

Along with the capacity to leverage data into marketing programmes, programmatic growth has been driven by the need for agile communication. It enables clients to respond quickly to changes in the market and to make ongoing real-time optimisation.

While most agencies run self-service trading desks over managed-service, they are still used as an overflow option and by smaller operators. Another driver of managed-services is the scarcity of programmatic resources, with demand amplified by clients bringing operations in-house.

The ability to monetise both inventory and data is driving programmatic growth for publishers. Top New Zealand media owners, including TVNZ, Media Works, NZME and Stuff, have packaged their inventory through KPEX to streamline trading. Bringing greater transparency, KPEX recently shifted to a first price auction model to open up more inventory through programmatic. While publisher guaranteed deals are emerging, RTB is still most common, followed by private marketplace deals.

Although digitally native inventory is growing through programmatic, expansion through traditional channels has been sluggish. A fair amount of work is still required to develop infrastructure and industry standards across non-digital channels. Using formats like that of display advertising, digital OOH is likely to be first to open up inventory to programmatic trading.

By merging data with real-time communication, programmatic is making great strides towards perfecting a one-on-one dialogue with customers.

Forecasts

Advertising spend (Nkr mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total digital	4,803	5,564	6,015	7,513	7,931	9,017	9,721	10,353	11,118
Total display	1,754	2,126	2,340	2,416	3,247	3,754	4,426	5,071	5,667
Banners + other traditional display	-	-	-	-	-	-	-	-	-
Video	-	-	-	-	-	-	-	-	-
Native	-	-	-	-	-	-	-	-	-

Programmatic spend (Nkr mill)

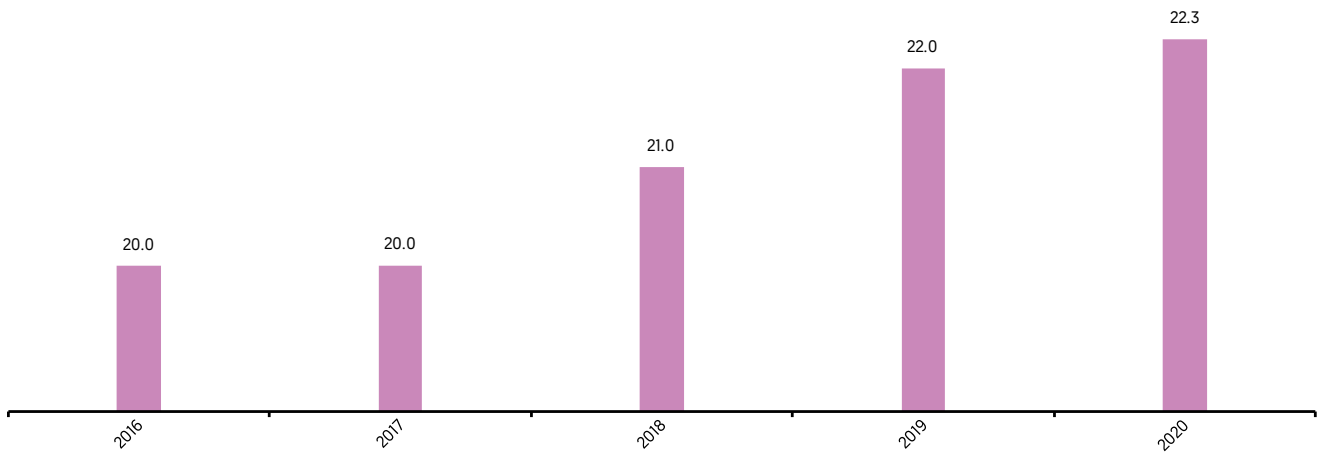
	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total programmatic display	-	-	-	-	649.1	750.8	929.5	1,115.5	1,263.8
Banners + other traditional display	-	-	-	-	-	-	-	-	-
Video	-	-	-	-	-	-	-	-	-
Native	-	-	-	-	-	-	-	-	-

Top sell side vendors in market

- 
- 1 Google [DBM]
 - 2 Adform
 - 3 Appnexus

Source: Zenith

Programmatic share of display advertising spend (%)



Cost by media channel

Average programmatic CPM by media channel (US\$)

	2012	2013	2014	2015	2016	2017	2018
Overall	-	9.09	1.48	1.44	-	-	-
Display	-	10.05	1.48	1.44	-	-	-
Mobile	-	10.05	-	-	-	-	-
Video	-	23.72	-	-	-	-	-
Social	-	-	-	-	-	-	-

Average programmatic CPC by media channel (US\$)

	2012	2013	2014	2015	2016	2017	2018
Overall	-	14.34	2.06	3.70	-	-	-
Display	-	23.72	2.06	3.70	-	-	-
Mobile	-	23.72	-	-	-	-	-
Video	-	-	-	-	-	-	-
Social	-	-	-	-	-	-	-

Average programmatic CTR by media channel (%)

	2012	2013	2014	2015	2016	2017	2018
Overall	-	0.06	0.07	0.04	0.19	-	-
Display	-	0.04	0.07	0.04	-	-	-
Mobile	-	0.04	-	-	-	-	-
Video	-	0.04	-	-	-	-	-
Social	-	-	-	-	-	-	-

Source: Zenith estimates

Programmatic has been growing fast over the past few years and several different tech vendors are present in the market. The main ones are Google (DBM), Adform and Appnexus. A large proportion of total inventory is now available to be traded programmatically, but some formats are still only available with direct buys. Traditional ad networks have been almost completely replaced by programmatic, and some of the largest advertisers have taken programmatic in-house.

The market is now close to 100% self-service; agencies need to have control due to an industry focus on transparency. Private deals are most common here.

Some outdoor operators have been testing programmatic booking, but only on a very limited scale so far.

Peru

Forecasts

Advertising spend (US\$ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total digital	37.0	44.0	66.0	77.0	86.0	96.0	106.0	119.0	133.0
Total display	-	-	-	70.1	72.0	88.8	94.9	106.5	115.8
Banners + other traditional display	-	-	-	57.1	52.9	63.9	65.6	71.9	77.0
Video	-	-	-	12.5	18.6	24.0	28.0	33.0	37.0
Native	-	-	-	0.5	0.5	0.9	1.3	1.6	1.8

Programmatic spend (US\$ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total programmatic display	-	-	-	0.46	0.41	0.69	0.82	1.04	1.25
Banners + other traditional display	-	-	-	0.33	0.29	0.48	0.58	0.73	0.88
Video	-	-	-	0.09	0.08	0.14	0.16	0.21	0.25
Native	-	-	-	0.05	0.04	0.07	0.08	0.10	0.13

Top five buy side technology in market

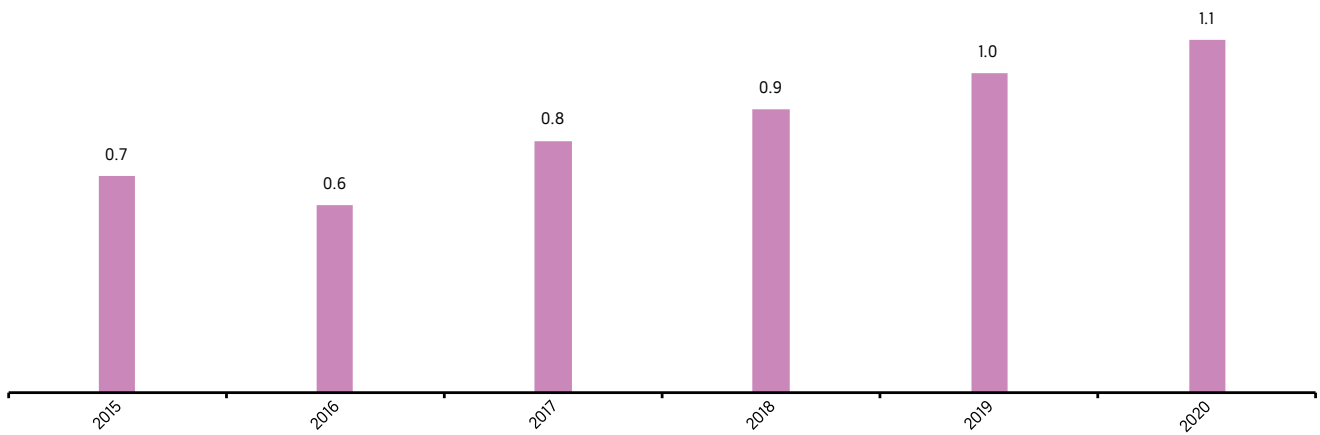
1	Mediamath
2	DMB
3	Teads
4	Sonata
5	DataExpand

Top five sell side vendors in market (2017)

1	Headway
2	Google
3	Teads
4	TapTap
5	Weborama

Source: Publicis One

Programmatic share of display advertising spend (%)



Providers of programmatic technology include IMS Connect, MediaMath and Google DoubleClick. Ad networks are used mainly to expand the scope of campaigns, target niche audiences and use special formats.

Knowledge of programmatic trading is quite basic but improving. International clients have pushed for the efficiencies available from programmatic booking and this has had an effect on the market overall.

Programmatic will begin to develop more quickly over the next few years, as there is a general push towards the use of this type of purchase. At the agency level, the self-service model is sought.

PMPs are already working with some clients, although the most popular format remains open auction. Over time, both audience [DMP] and inventory [Adexchange] will be handled using private agreements.

Philippines

Cost by media channel

Average programmatic CPM by media channel (US\$)

	2012	2013	2014	2015	2016	2017	2018
Overall	-	-	0.38	0.49	1.60	1.63	2.69
Display	-	-	0.37	0.47	1.13	1.48	2.43
Mobile	-	-	0.22	0.39	0.42	4.83	5.53
Video	-	-	0.48	5.77	7.28	6.89	7.41
Social	-	-	-	-	-	-	-

Average programmatic CPC by media channel (US\$)

	2012	2013	2014	2015	2016	2017	2018
Overall	-	-	0.28	0.33	1.20	1.46	2.35
Display	-	-	0.28	0.34	1.43	1.57	2.57
Mobile	-	-	0.07	0.16	0.00	1.45	3.44
Video	-	-	1.42	0.82	0.92	0.82	1.52
Social	-	-	-	-	-	-	-

Average programmatic CTR by media channel (%)

	2012	2013	2014	2015	2016	2017	2018
Overall	-	-	0.13	0.15	0.13	0.11	0.11
Display	-	-	0.14	0.14	0.08	0.09	0.09
Mobile	-	-	0.31	0.24	14.29	0.33	0.16
Video	-	-	0.03	0.70	0.79	0.84	0.49
Social	-	-	-	-	-	-	-

Source: Zenith estimates

Programmatic adoption is quite low in the Philippines; we estimate it accounts for around 15% of the total digital market. However, we think it will grow by around 50% a year over the next two years as local marketers' understanding of the tools becomes more sophisticated. The other driving factor has been the rollout late last year of Precision Social, which has allowed us to migrate a number of small clients [those still on auction] from direct buys to programmatic.

Current usage centres on DSPs, with a number of suppliers including Komli, Innity and Appier actively chasing clients and agencies for business. Ad servers are barely used. There seems to be a bigger interest in DMPs, but costs are a hindrance. Knowledge of programmatic remains limited among clients, with only a few exceptions. Clients regularly have to be reminded of what programmatic delivers to see the value of spending an extra 30% on top of media costs.

Managed services predominate. Only the two leading telcos have their own in-house groups for digital media planning

and buying, but they still rely on third parties like Admob to handle their programmatic buys. The level of sophistication/knowledge needed to go self-service does not yet exist in this market. The investment required [in terms of tech stack and talent] is another barrier.

The market consumes a large amount of foreign media due to the prevalence of English, and so this tends to be our biggest source of inventory. There is a tendency to jump on foreign trends and fast-rising publishers such as BuzzFeed.

We have not seen any interest in programmatic coming from traditional media channels locally. These tend to be very old-school and conservative in their marketing approach. And the OOH landscape is very fragmented, consisting of many small family-run businesses.

The only current opportunity is TV Sync, which has been in place since the end of 2016 and connects to the feeds of the two big TV networks.

Forecasts

Advertising spend (PLN mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total digital	1,211.0	1,300.0	1,458.0	1,614.0	1,807.0	2,025.0	2,227.0	2,400.0	2,552.0
Total display	-	-	-	1,128.0	1,256.8	1,420.3	1,564.6	1,680.0	1,835.7
Banners + other traditional display	-	-	-	859.0	917.3	966.4	982.0	970.3	1,031.8
Video	-	-	-	269.0	339.5	453.9	582.6	709.7	803.9
Native	-	-	-	-	-	-	-	-	-

Programmatic spend (PLN mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total programmatic display	-	-	-	43.8	249.0	384.8	489.9	648.0	842.2
Banners + other traditional display	-	-	-	37.7	216.0	260.6	283.2	338.6	414.8
Video	-	-	-	6.1	33.0	123.0	200.9	298.1	412.7
Native	-	-	-	-	-	1.1	5.9	11.3	14.7

Programmatic spend by type of deal (PLN mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Open (RTB)	-	-	-	39.4	211.7	290.5	308.2	372.6	429.5
Private marketplaces	-	-	-	0.9	12.5	34.6	58.8	97.2	143.2
Preferred deals	-	-	-	3.5	24.9	57.7	117.6	168.5	252.6
Guaranteed	-	-	-	0.0	0.0	1.9	5.4	9.7	16.8

Top five buy side technology in market

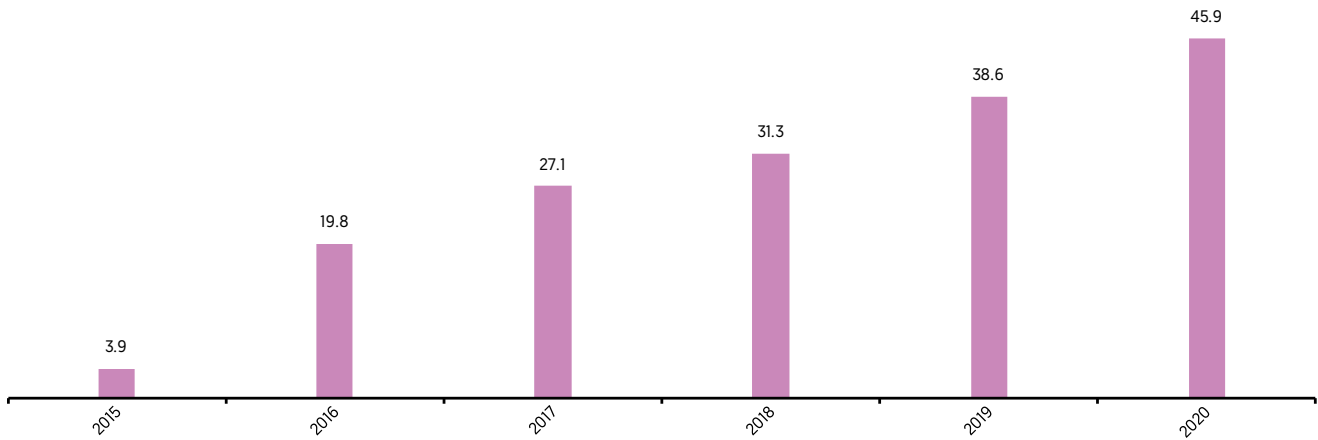
- 1 Display&Video 360 by Google
- 2 Adform
- 3 AppNexus
- 4 Criteo
- 5 RTB House

Top five sell side vendors in market

- 1 Doubleclick Ad Exchange by Google
- 2 Adform
- 3 Smart RTB+
- 4 Rubicon
- 5 AppNexus

Source: Zenith, IAB Polska/PwC AdEx, IAB Europe/IHS Markit, AdForm

Programmatic share of display advertising spend (%)



Cost by media channel

Average programmatic CPM by media channel (US\$)

	2012	2013	2014	2015	2016	2017	2018
Overall	0.98	1.07	0.72	0.59	0.67	1.63	2.20
Display	0.98	1.07	0.72	-	1.48	1.56	1.99
Mobile	0.98	1.07	0.51	-	0.00	0.43	1.52
Video	1.27	1.37	7.56	-	8.53	7.16	6.11
Social	-	-	-	-	-	-	-

Average programmatic CPC by media channel (US\$)

	2012	2013	2014	2015	2016	2017	2018
Overall	1.27	1.14	0.75	0.27	0.41	0.97	1.03
Display	1.27	1.37	1.03	-	0.83	0.96	1.02
Mobile	1.27	1.37	0.10	-	-	0.15	0.74
Video	0.00	0.03	0.28	-	1.57	1.24	1.11
Social	-	-	-	-	-	-	-

Average programmatic CTR by media channel (%)

	2012	2013	2014	2015	2016	2017	2018
Overall	0.08	0.09	0.10	0.22	0.16	0.17	0.21
Display	0.08	0.08	0.07	-	0.18	0.16	0.20
Mobile	0.08	0.08	0.52	-	-	0.29	0.20
Video	0.08	0.08	2.66	-	0.54	0.58	0.55
Social	-	-	-	-	-	-	-

Source: Zenith estimates

Google is the dominant technology provider in the Polish market, its DFP being used by major local publishers. Google AdExchange has the most potential in bid requests, and Display & Video 360 by Google is the most popular DSP. The second most popular technology stack – Adform – has also noted intensive growth in SSP and DSP usage. In 2018, there has been steady growth in programmatic trading in the Polish market. Some major advertisers have decided to fully transfer their digital marketing budgets to programmatic only.

One short-term barrier to growth has been the limiting of the potential of third-party data, which shrank after GDPR implementation came into force on 25th May and still hasn't recovered. Publishers failed to come to a common understanding of the new law, having a variety of opinions and interpretations. This has meant that some vendors faced a noticeable drop in impressions, which resulted in a fall in ad revenue.

The majority of programmatic spend is self-service, mostly placed in agencies and remarketing companies. What still encourages advertisers and agencies to use managed services are direct publisher reservations, for example, home-page takeovers.

There is a great demand for knowledge in the market, which is reflected in the popularity of conferences about the topic. The events are organised by DSP/SSP platforms, data suppliers, publishers, or within IAB structures. The level of education is correlated with market share - major players (advertisers, publishers and agencies) are well educated and quite experienced.

The most popular type of deal is the preferred deal with a fixed price, as the most intuitive for both agency and publisher. However, some of the major publishers have decided to build their programmatic offering based on private auctions. Programmatic guaranteed is still not very popular.

Programmatically bought outdoor campaigns are becoming more popular every year in Poland, but the inventory available remains quite limited. A few corporate vendors with a large amount of digital experience are testing programmatic buying in print advertising. No other traditional media are even close to changing their buying model.

Puerto Rico

The current market adoption of programmatic technology in Puerto Rico is low, and only top tier companies with big media budgets are working in this sector. Banking and insurance companies are among the few that use this at the moment.

There is a lack of knowledge, specifically on the client's side. Education is being led by agencies and vendors.

There has been growth in programmatic, though, for two main reasons: 1. global brands are asking for this technology to be applied in all markets; and 2. local publishers are using similar technologies and providing more options. It is estimated that around 15%-20% of the total digital budget is spent on programmatic (both managed and self-served).

Currently, most of the programmatic spend is in managed service. Companies like Xaxis are managing this for the agencies in their group. Others, such as Eikon, Glu and Yume, also provide this service.

The most advanced publishers in Puerto Rico are the online news portals of the top print companies, such as GFR Media and Metro. Growth will be steady among companies that adopt programmatic and learn how to apply first party data to the third party data that local publishers provide.

In terms of deals, they are mostly CPMs and CPCs based on the selected audience. Most of the inventory is not on a guaranteed basis.

Within traditional media channels, only a few local newspaper portals are offering programmatic trading. Other traditional channels, like OOH and TV, are still in the development phase.

Forecasts

Advertising spend (€ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total digital	32.9	36.2	40.5	50.7	60.8	73.0	83.9	96.5	111.0
Total display	29.0	30.8	34.1	41.6	48.7	59.8	68.8	79.1	88.8
Banners + other traditional display	20.0	19.0	21.0	25.0	31.0	34.0	37.0	38.0	42.9
Video	9.0	11.0	12.0	16.0	17.0	25.0	29.0	38.0	39.8
Native	-	-	1.0	1.0	1.0	1.0	3.0	4.0	6.1

Programmatic spend (€ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total programmatic display	-	-	-	2	5	15	21	34	35
Banners + other traditional display	-	-	-	2	4	10	11	15	14
Video	-	-	-	-	1	4	8	14	16
Native	-	-	-	-	-	1	2	5	5

Programmatic spend by type of deal (€ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Open (RTB)	-	-	-	2	4	10	13	16	14
Private marketplaces	-	-	-	0	1	3	5	9	9
Preferred deals	-	-	-	0	0	2	2	5	9
Guaranteed	-	-	-	0	0	1	1	4	3

Top five buy side technology in market

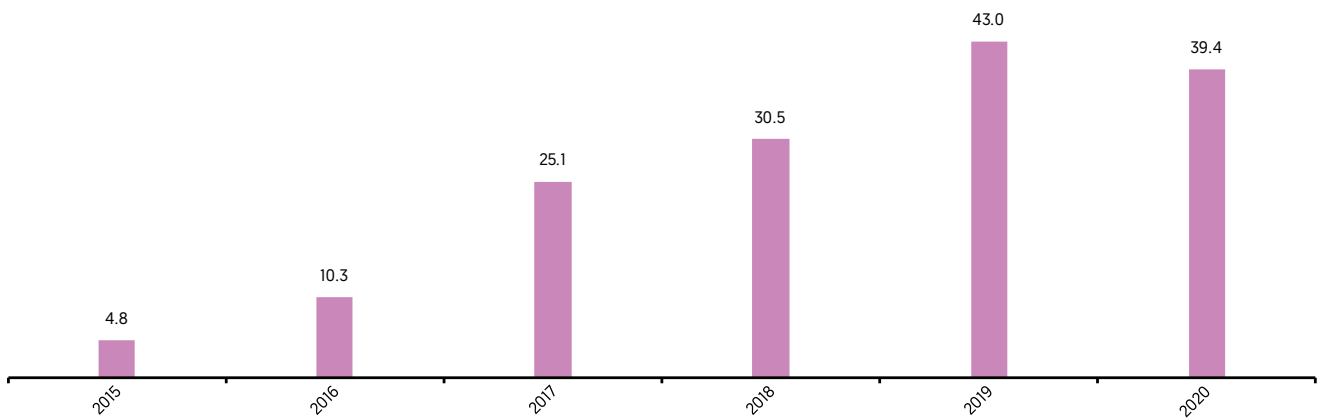
- 1 DoubleClick Bid Manager
- 2 AppNexus
- 3 Oath
- 4 AdForm
- 5 Sizmek DSP

Top five sell side vendors in market

- 1 DoubleClick For Publishers
- 2 AppNexus
- 3 WhiteOrbit
- 4 Smart RTB
- 5 PUBMatic

Source: Zenith

Programmatic share of display advertising spend (%)



Cost by media channel

Average programmatic CPM by media channel (US\$)

	2012	2013	2014	2015	2016	2017	2018
Overall	-	-	0.81	0.79	2.18	-	-
Display	-	-	0.81	0.79	-	-	-
Mobile	-	-	-	-	-	-	-
Video	-	-	-	-	-	-	-
Social	-	-	-	-	-	-	-

Average programmatic CPC by media channel (US\$)

	2012	2013	2014	2015	2016	2017	2018
Overall	-	-	1.20	0.65	0.18	-	-
Display	-	-	1.20	0.65	-	-	-
Mobile	-	-	-	-	-	-	-
Video	-	-	-	-	-	-	-
Social	-	-	-	-	-	-	-

Average programmatic CTR by media channel (%)

	2012	2013	2014	2015	2016	2017	2018
Overall	-	-	0.07	0.12	1.21	-	-
Display	-	-	0.07	0.12	-	-	-
Mobile	-	-	-	-	-	-	-
Video	-	-	-	-	-	-	-
Social	-	-	-	-	-	-	-

Source: Zenith estimates

Almost all market growth in Romania has been driven by multi-national advertisers having a clear and direct approach towards programmatic. In terms of knowledge, the market is maturing, mostly driven by big network agencies.

Large agencies are shifting towards self-service, while small agencies tend to use more managed services. Managed is driven by local re-sellers, locking out tech/data vendors.

The most common type of deal used is the preferred deal.

Within the publisher community, they keep almost all quality inventory for direct sales. Publishers not wanting to sell premium inventory in programmatic deals is a hurdle that needs to be overcome.

Programmatic within traditional media channels is still non-existent. There have been attempts at a digital OOH integration, but nothing concrete.

In the near future, we think the programmatic market will reach its maximum level, then stagnate.

Russia

Forecasts

Advertising spend (Roubles mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total digital	59,000	75,100	89,360	112,000	136,000	166,340	191,870	215,119	238,405
Total display	20,600	23,500	23,860	24,700	27,840	34,340	38,608	42,254	46,286
Banners + other traditional display	-	20,100	19,100	19,100	21,200	26,000	28,600	30,745	33,051
Video	-	3,400	4,760	5,600	6,640	8,340	10,008	11,509	13,236
Native	-	-	-	-	-	-	-	-	-

Programmatic spend (Roubles mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total programmatic display	-	-	1,098	2,190	4,904	7,501	12,012	17,863	22,481
Banners + other traditional display	-	-	955	1,910	4,240	6,500	10,010	13,835	16,525
Video	-	-	143	280	664	1,001	2,002	4,028	5,956
Native	-	-	-	-	-	-	-	-	-

Programmatic spend by type of deal (Roubles mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Open (RTB)	-	-	1,054	1,971	4,365	6,151	9,249	12,862	15,737
Private marketplaces	-	-	22	66	147	300	480	715	1,124
Preferred deals	-	-	22	153	343	675	1,081	1,608	2,248
Guaranteed	-	-	0	0	49	375	1,201	2,680	3,372

Top five buy side technology in market

- 1 DoubleClick by Google
- 2 Yandex
- 3 MyTarget [Mail.ru Group]
- 4 Segmento
- 5 Getintert

Top five sell side vendors in market

- 1 DFP [AdExchange]
- 2 Yandex [AdFox]
- 3 Between
- 4 Begun
- 5 Republer

Source: RARA, Zenith

Programmatic share of display advertising spend (%)



Cost by media channel

Average programmatic CPM by media channel (US\$)

	2012	2013	2014	2015	2016	2017	2018
Overall	1.07	0.71	0.74	0.56	0.70	1.12	1.02
Display	1.07	0.73	0.75	0.54	0.71	1.13	0.94
Mobile	1.07	0.73	0.29	0.50	0.58	0.80	0.81
Video	0.82	0.77	4.02	3.25	5.88	1.58	3.02
Social	-	-	-	-	-	-	-

Average programmatic CPC by media channel (US\$)

	2012	2013	2014	2015	2016	2017	2018
Overall	0.82	0.47	0.81	0.56	0.82	1.02	0.73
Display	0.82	0.77	1.11	0.62	0.92	1.07	0.80
Mobile	0.82	0.77	0.08	0.24	0.39	0.70	0.35
Video	-	0.15	0.14	0.83	3.53	0.83	1.13
Social	-	-	-	-	-	-	-

Average programmatic CTR by media channel (%)

	2012	2013	2014	2015	2016	2017	2018
Overall	0.13	0.15	0.09	0.10	0.09	0.11	0.14
Display	0.13	0.10	0.07	0.09	0.08	0.11	0.12
Mobile	0.13	0.10	0.37	0.21	0.15	0.11	0.23
Video	0.13	0.10	2.81	0.39	0.17	0.19	0.27
Social	-	-	-	-	-	-	-

Source: Zenith estimates

Programmatic technologies are well developed in Russia. Different DSPs, including local players, actively compete with each other. Some established local DSP products are entering the global market. The only remaining underdeveloped area is traffic verification, for which international tools are currently used.

Programmatic is rapidly growing in Russia. Advertisers are paying more and more attention to the channel and wish to exploit new opportunities to make use of first-party and other data. 'Data-driven' marketing is of interest to everyone, and programmatic provides a well developed infrastructure for its implementation. It also offers an opportunity to small advertisers to enter the market since entry costs are relatively low.

Full-service DSPs are very popular on the market, but are often used for arbitrage instead of programmatic sales as such. Top players provide self-service solutions that are used either directly or in a mix with other DSPs.

It is common practice for publishers to use several programmatic solutions from different vendors simultaneously, sometimes competing ones. Publishing houses and local publishers are the main players on the market. We expect to see some consolidation on the publisher side over the next few years, which should improve efficiency in the market.

Publishers and agencies have high levels of knowledge about programmatic trading, but advertisers are polarised. Some have deep knowledge, while others are just starting to pay attention. The growth of the market means that specialists are in demand.

Open deals are the most popular, while preferred and guaranteed deals are more popular than private marketplaces.

Broadcasters and contractors are just making their first attempts to sell TV and outdoor programmatically, and we expect to see more of this in 2019.

Forecasts

Advertising spend (RSD mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total digital	1,368.0	1,695.0	2,034.0	2,256.0	2,505.0	2,676.0	3,075.0	3,513.0	4,070.0
Total display	1,121.8	1,356.0	1,633.5	1,861.2	2,004.0	2,033.8	2,864.0	3,203.0	3,629.5
Banners + other traditional display	-	-	-	-	-	1,741.0	1,862.0	2,082.0	2,322.9
Video	-	-	-	-	-	293.0	859.2	960.9	1,197.7
Native	-	-	-	-	-	-	143.2	160.2	108.9

Programmatic spend (RSD mill)

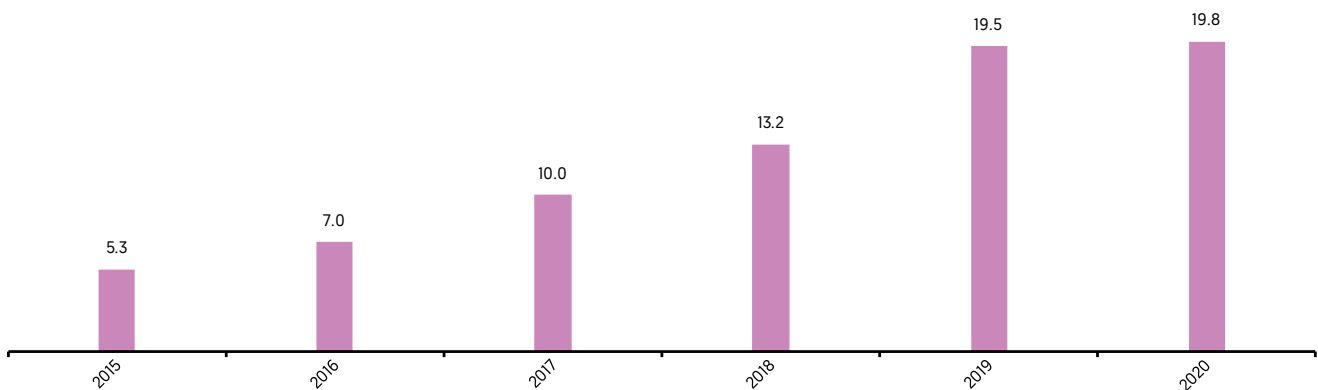
	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total programmatic display	-	-	-	98.1	140.3	203.4	379.0	625.0	718.8
Banners + other traditional display	-	-	-	-	131.0	146.0	223.0	377.0	416.9
Video	-	-	-	-	9.0	57.0	156.0	248.0	301.9
Native	-	-	-	-	-	-	-	-	-

Programmatic spend by type of deal (RSD mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Open (RTB)	-	-	-	98.1	134.7	164.7	291.0	526.0	611.8
Private marketplaces	-	-	-	-	1.4	10.2	31.0	42.0	50.0
Preferred deals	-	-	-	-	2.8	18.3	22.0	22.0	22.0
Guaranteed	-	-	-	-	1.4	10.2	35.0	35.0	35.0

Source: Zenith

Programmatic share of display advertising spend (%)



There is no local programmatic technology in Serbia. Providers from western Europe offer programmatic sales of some local web inventory, but there is plenty of room for improvement, for example local publishers opening up their premium inventory to programmatic buying.

Managed-service is dominant but self-service is increasing. Managed-service is popular because it allows local publishers to offer custom solutions and inventory for non-direct deals.

The programmatic market is still underdeveloped, with only basic knowledge among agencies and advertisers.

Trades are normally based on CPMs and CPDs, though viewable CPM trades are not yet available. CPC and CPV trading through RTB platforms are also common.

Local publishers are more and more open to programmatic buying, but the biggest obstacle is the lack of relevant local data about user behaviour in Serbia. Once agencies and clients have this data they will be much more motivated.

Adoption within traditional media channels is non-existent in the Serbian market at present.

Forecasts

Advertising spend (€ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total digital	35.0	58.0	76.0	91.0	112.0	126.0	140.0	155.0	175.0
Total display	35.0	40.0	45.0	44.7	57.9	62.4	68.2	73.9	75.0
Banners + other traditional display	35.0	40.0	45.0	36.0	44.0	47.0	48.0	49.0	49.0
Video	-	-	-	8.0	13.0	14.0	18.0	22.0	23.0
Native	-	-	-	0.7	0.9	1.4	2.2	2.9	3.0

Programmatic spend (€ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total programmatic display	-	-	1.0	3.0	6.0	10.0	14.0	20.0	23.0
Banners + other traditional display	-	-	1.0	2.4	5.2	9.0	12.8	18.6	20.0
Video	-	-	-	0.6	0.8	1.0	1.2	1.4	2.0
Native	-	-	-	-	-	-	-	-	1.0

Programmatic spend by type of deal (€ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Open [RTB]	-	-	1.0	3.0	6.0	8.7	12.0	16.5	18.0
Private marketplaces	-	-	0.0	0.0	0.0	1.0	1.4	2.0	2.0
Preferred deals	-	-	0.0	0.0	0.0	0.3	0.6	1.0	2.0
Guaranteed	-	-	0.0	0.0	0.0	0.0	0.0	0.5	1.0

Top five buy side technology in market

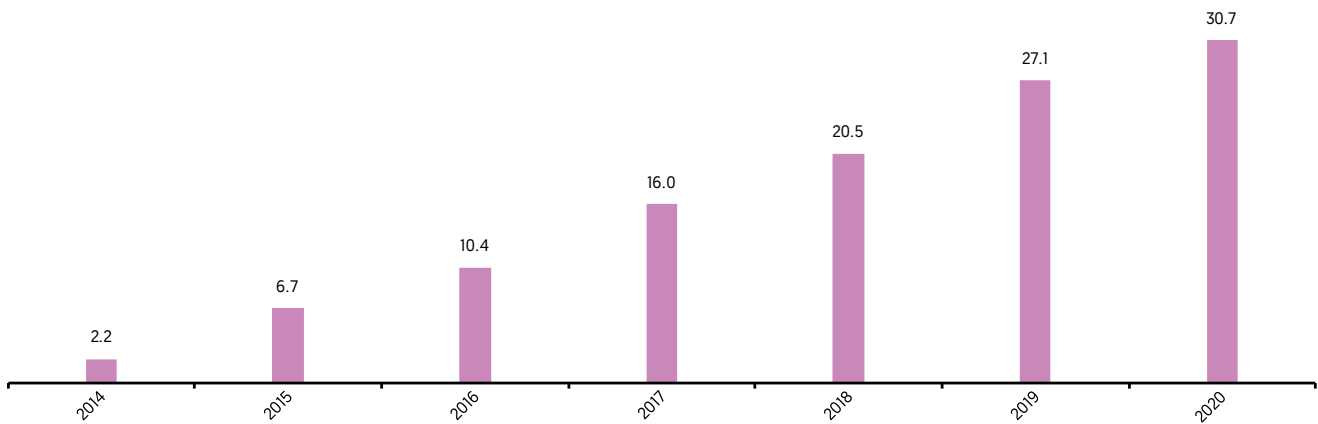
- 1 Adform
- 2 Display and Video 360
- 3 RTB House
- 4 Criteo
- 5 Sociomantic

Top five sell side vendors in market

- 1 Google Ad Manager
- 2 iBillboard
- 3 PubMatic
- 4 Smart RTB+
- 5 Rubicon

Source: IAB Slovakia, Adform, Zenith

Programmatic share of display advertising spend (%)



Almost all main publishers have implemented an SSP (normally DFP or Adform) and are trying to manage yields to push up prices. Preferred deals are available, though most campaigns are run through open auction. Publishers are expecting to see revenues from programmatic gradually increase.

The vendor Adform is the leading provider of knowledge about programmatic techniques, followed by international agencies.

Advertisers and agencies are in the early stages of putting together the data infrastructure needed to make the most of programmatic marketing. Advertisers are not yet ready to migrate their CRM data onto DMPs, and there is a scarcity of third-party data.

We expect direct deals to dominate Slovakian internet advertising for several years to come. There is currently no programmatic trading of traditional media, although it is possible this will change once online programmatic has become more established.

Forecasts

Advertising spend (€ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total digital	885.7	878.4	1,065.6	1,288.9	1,565.6	1,708.0	1,878.8	2,104.3	2,356.8
Total display	391.7	360.0	463.6	598.2	742.7	785.0	854.1	949.7	1,068.0
Banners + other traditional display	391.7	360.0	392.1	474.0	584.1	608.2	650.8	715.9	787.4
Video	-	-	71.5	124.2	158.6	176.8	203.3	233.8	280.6
Native	-	-	-	-	-	-	-	-	-

Programmatic spend (€ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total programmatic display	-	52.1	50.7	86.4	133.7	160.4	200.5	250.7	296.0
Banners + other traditional display	-	52.1	41.4	65.7	104.3	128.8	144.3	168.8	199.2
Video	-	-	9.3	20.6	29.4	26.9	30.9	36.8	44.2
Native	-	-	-	-	-	4.7	25.4	45.1	52.7

Programmatic spend by type of deal (€ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Open (RTB)	-	52.1	21.8	30.3	40.1	48.6	62.0	79.0	94.7
Private marketplaces	-	0.0	17.2	35.4	41.4	54.5	66.4	80.9	94.7
Preferred deals	-	0.0	7.6	13.8	38.8	43.1	54.9	70.0	82.9
Guaranteed	-	0.0	4.1	6.9	13.4	14.2	17.2	20.8	23.7

Top five buy side technology in market

- 1 DBM
- 2 Appnexus
- 3 Amazon
- 4 SmartRTB+
- 5 TTD

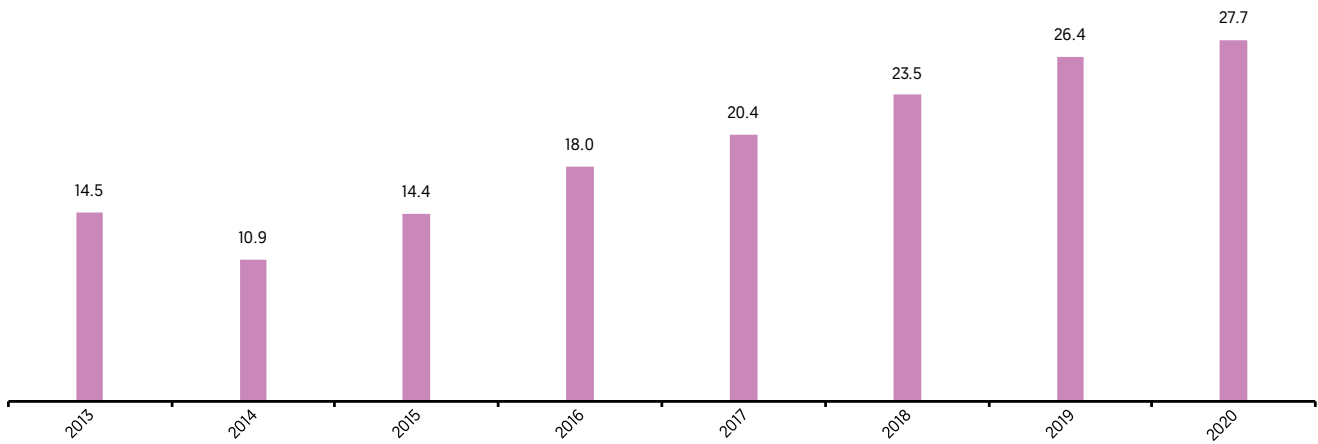
Top five sell side vendors in market

- 1 Doubleclick Ad Ex
- 2 Appnexus
- 3 Rubicon
- 4 SmartRTB+
- 5 SpotX

Source: IAB, Zenith

Note: The adspend figures from the IAB are somewhat different from those used in our Advertising Expenditure Forecasts, which are supplied by Infoadex. We use the IAB figures in this report because they are segmented in a more suitable manner for looking at programmatic marketing.

Programmatic share of display advertising spend (%)



Cost by media channel

Average programmatic CPM by media channel (US\$)

	2012	2013	2014	2015	2016	2017	2018
Overall	0.96	2.37	4.03	3.20	4.73	4.21	2.79
Display	0.96	0.79	1.23	1.39	2.50	2.93	1.88
Mobile	0.96	0.79	-	-	4.28	3.77	-
Video	0.88	1.05	8.22	9.45	9.66	7.71	9.81
Social	-	-	-	-	-	-	-

Average programmatic CPC by media channel (US\$)

	2012	2013	2014	2015	2016	2017	2018
Overall	0.88	0.61	0.79	0.84	0.86	1.30	0.77
Display	0.88	1.05	1.20	1.64	1.02	1.74	1.70
Mobile	0.88	1.05	-	-	1.67	1.98	-
Video	0.00	0.53	0.74	0.67	0.78	1.02	0.42
Social	-	-	-	-	-	-	-

Average programmatic CTR by media channel (%)

	2012	2013	2014	2015	2016	2017	2018
Overall	0.11	0.39	0.51	0.38	0.55	0.32	0.36
Display	0.11	0.07	0.10	0.08	0.24	0.17	0.11
Mobile	0.11	0.07	-	-	0.26	0.19	-
Video	0.11	0.07	1.11	1.41	1.24	0.76	2.32
Social	-	-	-	-	-	-	-

Source: Zenith estimates

Spanish ad tech is becoming more sophisticated, on both the buy side and the sell side. All the main editorial groups have the Salesforce DMP and are beginning to sell their audience clusters as a media channel to improve campaign performance.

Mar tech and ad tech are becoming more and more connected. The big technology vendors like Salesforce, Oracle and Adobe have consolidated the DMPs and DSPs, unifying previously fragmented data and creating a people-centric vision.

Premium publishers are now treating programmatic and direct inventory as equals in quality and priority, so advertisers are more willing to move their budgets from direct to programmatic buying. This is giving advertisers better price performance and more control over frequency.

Managed-service is common among direct-response advertisers, but for branding campaigns, self-service via the agency trading desk is more prominent.

There is still a lot of work to be done to address advertisers' concerns about brand safety, fraud and viewability.

Preferred deals guarantee high-quality inventory at a negotiated price, but need to be complemented by open deals, especially for direct response advertisers. Private auction models are also important. Guaranteed models will grow the most as demand for programmatic inventory increases.

Three main factors are driving the take-up of programmatic sales among publishers. First is the publishers' creation of their own data infrastructure by setting up DMPs. Second is their negotiation of strong second-party data deals with other publishers. Third is the introduction of technologies like header bidding, which makes existing inventory more valuable.

Digital radio channels are already sold programmatically. The main outdoor contractors are taking steps to digitalise and categorise their inventory; selling it programmatically will be the next step. The situation is a lot more complicated for television, and we think it will take several years before programmatic TV enters the mainstream.

Sweden

Forecasts

Advertising spend (SKr mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total digital	8,206	9,315	10,796	12,981	15,813	19,197	21,692	24,041	27,762
Total display	-	-	3,785	4,297	4,715	5,194	5,747	5,992	6,549
Banners + other traditional display	-	-	3,137	3,375	3,542	3,589	3,690	3,636	3,723
Video	-	-	648	922	1,157	1,605	2,058	2,355	2,827
Native	-	-	-	-	-	-	-	-	-

Programmatic spend (SKr mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total programmatic display	-	-	310.0	690.0	1,360.0	2,190.0	2,881.4	3,295.5	3,602.2
Banners + other traditional display	-	-	200.0	440.0	950.0	1,560.0	2,017.0	2,142.1	2,284.0
Video	-	-	110.0	250.0	410.0	630.0	864.4	1,153.4	1,318.2
Native	-	-	-	-	-	-	-	-	-

Top buy side technology in market

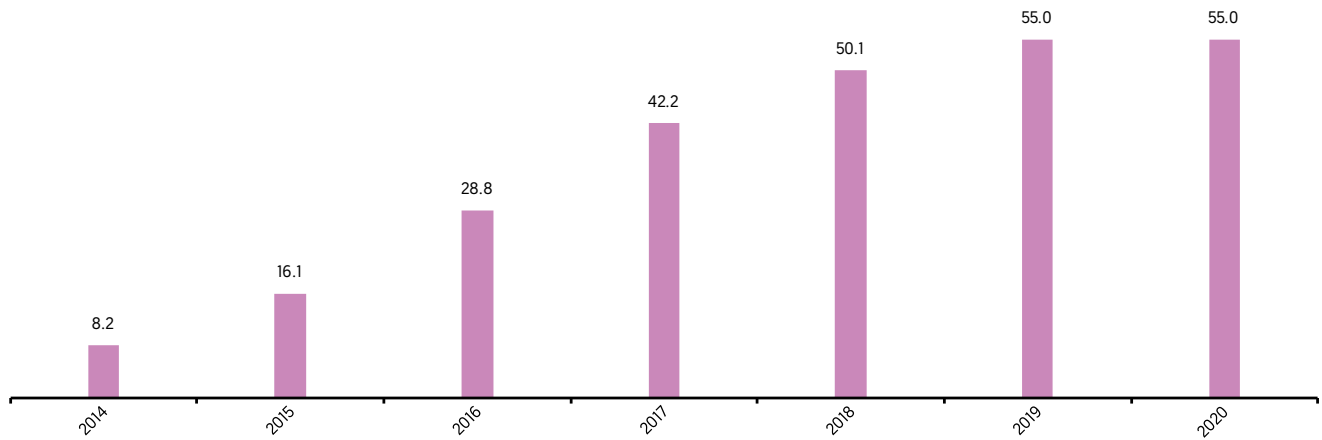
- 1 Doubleclick
- 2 Adform
- 3 Appnexus
- 4 Delta
- 5 Mediamath

Top five sell side vendors in market

- 1 Schibted
- 2 Microsoft
- 3 Bonnier
- 4 Leads
- 5 Keymobile

Source: IRM, Zenith

Programmatic share of display advertising spend (%)



Cost by media channel

Average programmatic CPM by media channel (US\$)

	2012	2013	2014	2015	2016	2017	2018
Overall	1.44	0.81	1.68	3.81	7.48	10.60	7.01
Display	1.44	0.81	1.17	2.47	-	7.62	6.53
Mobile	1.44	0.81	-	-	-	7.40	-
Video	2.86	1.33	-	-	15.85	16.89	7.10
Social	-	-	-	-	-	-	-

Average programmatic CPC by media channel (US\$)

	2012	2013	2014	2015	2016	2017	2018
Overall	2.86	1.33	1.62	2.81	4.71	5.17	5.71
Display	2.86	1.33	2.52	2.16	-	4.73	6.22
Mobile	2.86	1.33	-	-	-	4.56	-
Video	-	1.56	-	-	4.03	5.69	5.63
Social	-	-	-	-	-	-	-

Average programmatic CTR by media channel (%)

	2012	2013	2014	2015	2016	2017	2018
Overall	0.05	0.06	0.10	0.14	0.16	0.21	0.12
Display	0.05	0.06	0.05	0.11	-	0.16	0.10
Mobile	0.05	0.06	-	-	-	0.16	-
Video	0.05	0.06	-	-	0.39	0.30	0.13
Social	-	-	-	-	-	-	-

Source: Zenith estimates

In Sweden, the main ad servers are DCM and Adform, but we primarily use DCM due to global agreements. The main exchanges/SSPs are Rubicon, Google DoubleClick Ad Exchange and PubMatic. There are a few DSPs in the market, but competition is almost non-existent. We work with DBM [DV360] the most, but also use Adform's DSP.

The programmatic market in Sweden is growing. Video has been a major part of this growth during the last year, especially at Zenith. As an agency, we are pushing programmatic harder than we have done before, and it has developed a lot over the past two years.

There are still barriers to growth, however. Buyers are setting the limits for what can be done in the Swedish market. Agencies need to push for development, and also invest money and staff.

There is still a lack of knowledge and understanding about programmatic too. It is the responsibility of all involved in the programmatic ecosystem to change this. Agencies are educating clients to make them more comfortable with programmatic buys, and more willing to invest more. Publishers are also working towards a more programmatic friendly environment.

In terms of deals, when it comes to traditional display, the majority are PMP. For video, we usually buy partly on PMP and guaranteed deals; this is because good quality video inventory is fairly limited, and we usually only buy from three publishers.

Programmatic marketing in 'traditional' media has not yet taken off in Sweden, but when it does, there will be a lot of potential.

Forecasts

Advertising spend (SF mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total digital	674	744	848	1,012	1,135	1,279	1,440	1,631	1,801
Total display	170	186	210	259	268	283	291	304	330
Banners + other traditional display	-	-	-	-	-	-	-	-	-
Video	-	-	-	-	-	-	-	-	-
Native	-	-	-	-	-	-	-	-	-

Programmatic spend (SF mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total programmatic display	-	-	4.2	15.5	35.4	73.6	131.0	170.2	214.5
Banners + other traditional display	-	-	4.2	13.2	20.4	42.0	71.0	90.0	113.0
Video	-	-	-	2.3	15.0	30.6	57.0	72.2	85.5
Native	-	-	-	-	-	1.0	3.0	8.0	16.0

Programmatic spend by type of deal (SF mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Open (RTB)	-	-	3.4	1.6	3.5	7.4	13.1	17.0	21.5
Private marketplaces	-	-	0.8	9.3	15.9	33.1	57.6	73.2	87.9
Preferred deals	-	-	0.0	4.7	15.6	29.4	52.4	64.7	72.9
Guaranteed	-	-	0.0	0.0	0.4	3.7	7.9	15.3	32.2

Top buy side technology in market

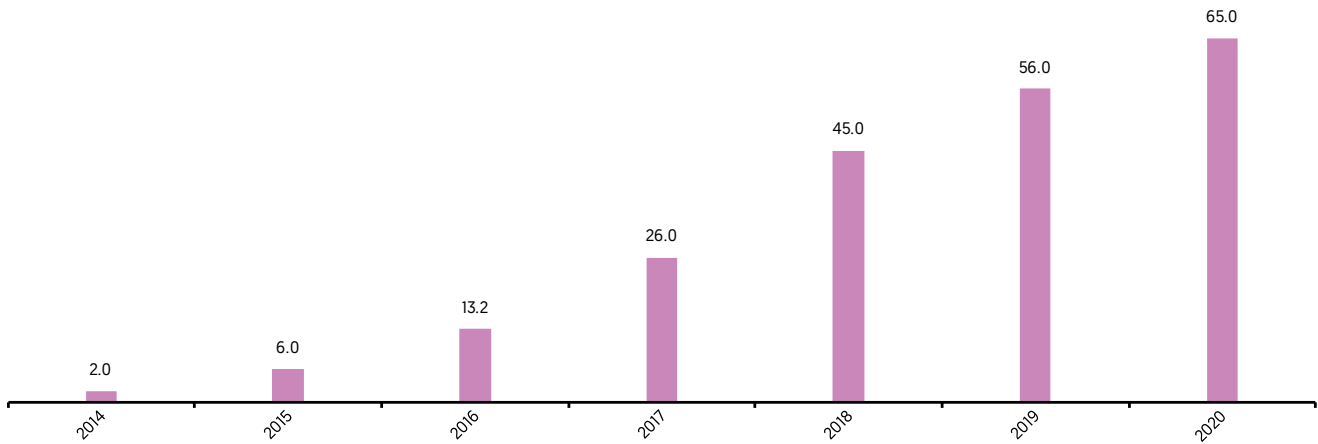
1	DV360
2	Appnexus
3	Adform
4	DataXu

Top five sell side vendors in market

1	Appnexus
2	Google AdExchange
3	Improve Digital
4	TeadsTV
5	Pubmatic

Source: Media Focus, Zenith

Programmatic share of display advertising spend (%)



Cost by media channel

Average programmatic CPM by media channel (US\$)

	2012	2013	2014	2015	2016	2017	2018
Overall	-	1.07	3.41	10.65	33.96	-	-
Display	-	1.07	6.26	12.74	-	-	-
Mobile	-	1.07	-	-	-	-	-
Video	-	2.00	-	-	-	-	-
Social	-	-	-	-	-	-	-

Average programmatic CPC by media channel (US\$)

	2012	2013	2014	2015	2016	2017	2018
Overall	-	2.00	4.64	8.81	12.99	-	-
Display	-	2.00	5.35	8.45	-	-	-
Mobile	-	2.00	-	-	-	-	-
Video	-	-	-	-	-	-	-
Social	-	-	-	-	-	-	-

Average programmatic CTR by media channel (%)

	2012	2013	2014	2015	2016	2017	2018
Overall	-	0.05	0.07	0.12	0.26	-	-
Display	-	0.05	0.12	0.15	-	-	-
Mobile	-	0.05	-	-	-	-	-
Video	-	0.05	-	-	-	-	-
Social	-	-	-	-	-	-	-

Source: Zenith estimates

Programmatic marketing is developing quite quickly in Switzerland. It started at the end of 2014 with some publishers opening up programmatic sales and discussing this with agencies and clients. Because the publishers were scared of price erosion, most focused on private marketplace deals. This went down well with clients, who demand premium Swiss traffic instead of low-quality cross-border traffic.

After an initial spurt of growth, open RTB buying never really took off in Switzerland. Private deals are the most common type, followed by preferred deals. Automated guaranteed deals have been tested, but are still hardly used and most publishers do not offer them.

Ad networks are in a difficult situation, and only those that are developing transparent programmatic products have

potential for future growth. Agency self-service buying and publisher self-service selling are becoming common-place. Managed-service through technology providers is hardly used on either the sell or the buy side.

Most of the bigger international SSPs and DSPs are used in the Swiss market. Various national and international partners offer data services.

Programmatic is one of the most discussed topics in digital marketing and there is a high demand for knowledge. There are still very few specialists and knowledge is one of the most scarce resources in the market.

There have been discussions about adapting programmatic techniques for other media, and tests are being conducted for radio and TV.

Taiwan

Forecasts

Advertising spend (NT\$ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total digital	11,601	13,680	16,177	19,352	25,871	33,097	37,394	39,825	42,238
Total display	8,121	8,892	11,470	13,749	19,711	25,177	28,761	30,761	32,856
Banners + other traditional display	-	-	-	-	-	-	-	-	-
Video	-	-	-	-	-	-	-	-	-
Native	-	-	-	-	-	-	-	-	-

Programmatic spend (NT\$ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total programmatic display	-	-	-	-	6,726	9,565	12,389	15,142	17,530
Banners + other traditional display	-	-	-	-	-	-	-	-	-
Video	-	-	-	-	-	-	-	-	-
Native	-	-	-	-	-	-	-	-	-

Top buy side technology in market

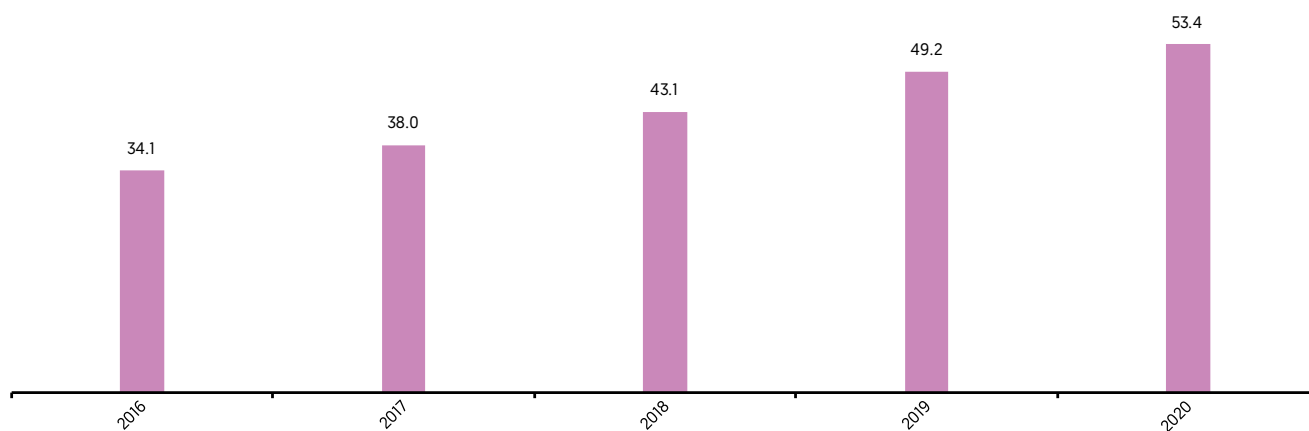
1	DBM
2	Criteo

Top sell side vendors in market

1	Double Click for Publisher [DFP]
---	----------------------------------

Source: Zenith

Programmatic share of display advertising spend (%)



Cost by media channel

Average programmatic CPM by media channel (US\$)

	2012	2013	2014	2015	2016	2017	2018
Overall	-	-	0.51	0.61	1.13	0.83	2.26
Display	-	-	0.53	0.58	0.73	0.74	1.05
Mobile	-	-	0.22	0.30	0.98	1.37	0.06
Video	-	-	-	7.30	8.17	9.03	7.43
Social	-	-	-	-	-	-	-

Average programmatic CPC by media channel (US\$)

	2012	2013	2014	2015	2016	2017	2018
Overall	-	-	1.28	0.49	1.02	0.57	0.97
Display	-	-	1.84	0.50	0.75	0.68	1.22
Mobile	-	-	0.09	0.16	1.40	1.30	0.01
Video	-	-	-	0.54	2.33	0.23	0.86
Social	-	-	-	-	-	-	-

Average programmatic CTR by media channel (%)

	2012	2013	2014	2015	2016	2017	2018
Overall	-	-	0.04	0.12	0.11	0.15	0.23
Display	-	-	0.03	0.12	0.10	0.11	0.09
Mobile	-	-	0.25	0.19	0.07	0.11	0.67
Video	-	-	-	1.34	0.35	3.86	0.86
Social	-	-	-	-	-	-	-

Source: Zenith estimates

The market can be divided into two segments according to the demand and supply side:

- DSPs - Google GMP dominates the self-service market, but TTD is also trying to step into the market. On the other side, Criteo and Scupio have a steady share of the managed-service market.
- SSPs - 90% of publisher inventories are managed by Google DFP.

There are two main reasons behind the recent growth in programmatic. Firstly, video is driving market demand, especially in out-stream and in-banner video formats. Secondly, advertisers are adopting a more data-driven strategy with first-party data, which makes them more willing to adopt programmatic as a buying method.

The use of managed-service or self-service depends on different objective settings. If clients want to control inventory, they will go for self-service. When the strategy goes for performance or lead generation, managed-service would be better.

Google and Oath are leading education about programmatic in Taiwan. However, marketers generally have different levels of knowledge based on their different roles.

Buy-side marketers know more about data, while marketers on the supply-side are good at dealing with inventory.

Open exchange is the most common type of deal, but private marketplaces (PMPs) are growing, and more and more agencies are using these, especially in programmatic direct buy. The rise of PMPs has also brought about the development of inventory aggregators. On the other hand, some non-Google players are trying to introduce pre-bids into the market, such as AppNexus and Rubicon. They are trying to adopt header bidding for premium inventory, and marketers are gradually accepting this method to avoid Google DFP's inefficient waterfall process.

The main reason for publishers to adopt programmatic is to increase fill rate and CPM price. Therefore, publishers will try to increase the percentage of header bidding adoption.

Digital TV and outdoor advertising are most promising for the expansion of programmatic deals to other media. However, strict regulation limits opportunities to use data to serve advertisements to TV audiences, and piecemeal data from separate digital outdoor systems will make a programmatic outdoor market difficult to put together.

Top five buy side technology in market

- 1 DBM
- 2 TTD
- 3 Adobe
- 4 Innity
- 5 Vserv

Top five sell side vendors in market

- 1 DBM
- 2 TTD
- 3 Adobe
- 4 Innity
- 5 Vserv

Source: Zenith

Cost by media channel

Average programmatic CPM by media channel (US\$)

	2012	2013	2014	2015	2016	2017	2018
Overall	-	-	0.37	0.41	1.45	1.81	2.19
Display	-	-	0.37	0.41	0.77	1.26	2.19
Mobile	-	-	-	-	-	-	-
Video	-	-	-	-	5.54	4.67	-
Social	-	-	-	-	-	-	-

Average programmatic CPC by media channel (US\$)

	2012	2013	2014	2015	2016	2017	2018
Overall	-	-	0.70	0.44	1.06	1.20	1.80
Display	-	-	0.70	0.44	0.75	1.06	1.80
Mobile	-	-	-	-	-	-	-
Video	-	-	-	-	1.63	1.45	-
Social	-	-	-	-	-	-	-

Average programmatic CTR by media channel (%)

	2012	2013	2014	2015	2016	2017	2018
Overall	-	-	0.05	0.09	0.14	0.15	0.12
Display	-	-	0.05	0.09	0.10	0.12	0.12
Mobile	-	-	-	-	-	-	-
Video	-	-	-	-	0.34	0.32	-
Social	-	-	-	-	-	-	-

Source: Zenith estimates

Growth in programmatic has been slow in Thailand as clients are unsatisfied with the results compared to other platforms. However, global clients have started to adopt ad servers.

There is not a lot of expertise in the programmatic sector, but agencies are leading education.

Local publishers have tried to set up their own programmatic platforms, but without much success.

The trend in the market is to use self-service as it provides more optimization and efficiency. The most common type of deals are open marketplace and real time bidding.

Within traditional media channels there is no programmatic at the moment, just concept ideas for outdoor, radio and TV.

Over the next few years, we need strong results to convince clients to commit to programmatic in the long term, as other platforms are still proving better in the short term.

Forecasts

Advertising spend (Turkish Lira mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total digital	421.1	495.0	1,182.0	1,484.0	1,736.0	2,297.0	2,549.7	2,830.1	3,169.7
Total display	379.8	446.0	507.0	600.0	738.0	1,265.0	1,404.2	1,558.6	1,745.6
Banners + other traditional display	329.8	371.0	387.0	421.0	501.0	916.9	929.2	1,010.6	1,130.6
Video	50.0	75.0	100.0	134.0	179.0	269.5	390.0	455.0	510.0
Native	-	-	20.0	45.0	58.0	78.6	85.0	93.0	105.0

Programmatic spend (Turkish lira mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total programmatic display	-	-	-	20	58	515	970	1,110	1,235
Banners + other traditional display	-	-	-	15	50	450	655	720	760
Video	-	-	-	3	5	55	270	340	405
Native	-	-	-	2	3	10	45	50	70

Programmatic spend by type of deal (Turkish lira mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Open (RTB)	-	-	-	17	41	258	420	445	460
Private marketplaces	-	-	-	0	0	0	20	35	50
Preferred deals	-	-	-	3	12	155	320	380	415
Guaranteed	-	-	-	0	6	103	210	250	310

Top five buy side technology in market

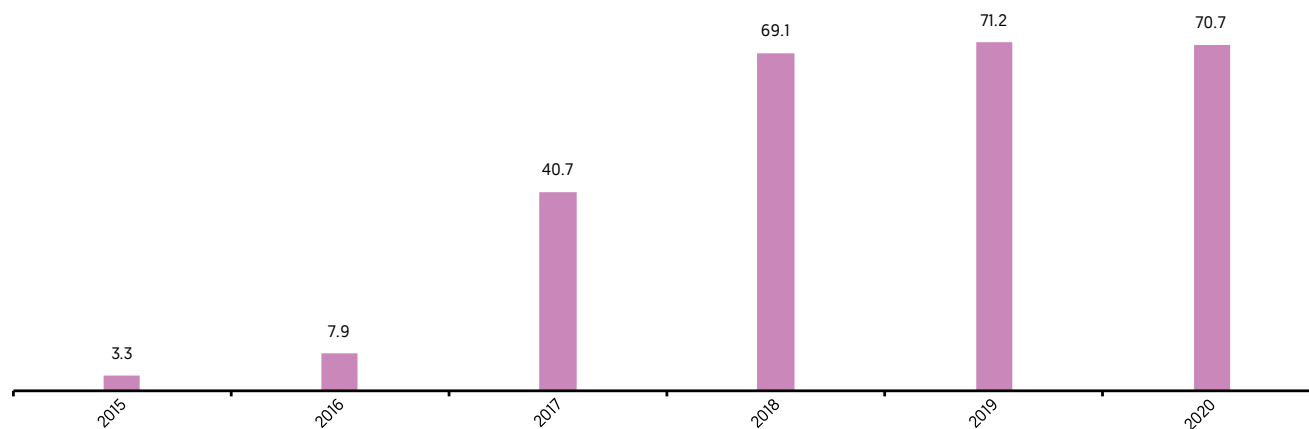
- 1 DBM
- 2 Adform
- 3 Mediamath
- 4 Trade Desk
- 5 Sizmek

Top five sell side vendors in market

- 1 D Adx
- 2 Appnexus
- 3 Adform
- 4 Rubicon
- 5 BidSwitch

Source: Zenith

Programmatic share of display advertising spend (%)



Cost by media channel

Average programmatic CPM by media channel (US\$)

	2012	2013	2014	2015	2016	2017	2018
Overall	-	1.76	0.88	0.55	0.83	1.62	1.66
Display	-	1.73	0.85	0.48	0.60	1.21	1.13
Mobile	-	1.73	0.79	0.38	0.44	0.90	1.27
Video	-	0.31	7.24	6.34	6.80	2.75	2.87
Social	-	-	-	-	-	-	-

Average programmatic CPC by media channel (US\$)

	2012	2013	2014	2015	2016	2017	2018
Overall	-	0.31	0.61	0.36	0.69	0.53	0.67
Display	-	0.31	0.88	0.69	1.01	1.14	0.86
Mobile	-	0.31	0.36	0.19	0.33	0.48	0.45
Video	-	0.16	0.20	0.13	0.85	0.41	0.69
Social	-	-	-	-	-	-	-

Average programmatic CTR by media channel (%)

	2012	2013	2014	2015	2016	2017	2018
Overall	-	0.57	0.14	0.16	0.12	0.30	0.25
Display	-	0.56	0.10	0.07	0.06	0.11	0.13
Mobile	-	0.56	0.22	0.20	0.13	0.19	0.28
Video	-	0.56	3.59	4.70	0.80	0.66	0.41
Social	-	-	-	-	-	-	-

Source: Zenith estimates

The Turkish market is currently Google-dominated. Google platforms are the most used DSPs and its SSP Adserver the most used SSP in the market. Adform is also emerging as a strong player, a full-stack technology solution partner. Adobe and Bluekai also form part of the mix with their DMP solutions.

Programmatic is seen as an efficient media buying method that can be adopted by both agencies and clients. Data driven marketing campaigns are as important as ever in the market, so programmatic is rising in popularity as well. Self-service is the current trend in agencies. However, managed service is often chosen by advertisers, who are inclined to partially bring programmatic in-house.

Private deals are the most common deal type used in the market, with guaranteed deals following close behind as this type is pushed on the market by publishers.

The publishers are looking for ways to be able to predict incoming budgets, so they are promoting stricter types of deals like PG, which affords them more controlled yield management.

Overall, the adoption of programmatic buying methods in traditional media channels is still in its early stages, if growing rapidly.

Ukraine

Forecasts

Advertising spend (UAH mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total digital	670.0	2,000.0	2,150.0	2,365.0	3,100.0	4,200.0	5,050.0	6,100.0	7,500.0
Total display	-	1,040.0	1,075.0	1,275.0	1,800.0	2,400.0	2,900.0	3,700.0	4,450.0
Banners + other traditional display	-	840.0	870.0	950.0	1,300.5	1,661.1	1,975.4	2,180.7	2,626.8
Video	-	200.0	205.0	325.0	499.5	738.9	924.6	1,519.3	1,823.2
Native	-	-	-	-	-	-	-	-	-

Programmatic spend (UAH mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total programmatic display	-	20.8	32.3	61.2	170.6	374.5	695.1	1,351.6	2,076.0
Banners + other traditional display	-	16.8	26.1	45.6	122.2	263.7	463.9	865.4	1,298.1
Video	-	4.0	6.1	15.6	48.4	110.8	231.1	486.2	777.9
Native	-	-	-	-	-	-	-	-	-

Programmatic spend by type of deal (UAH mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Open (RTB)	-	20.8	32.3	61.2	170.6	374.5	695.1	1,351.6	2,076.0
Private marketplaces	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Preferred deals	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Guaranteed	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Top five buy side technology in market (2017)

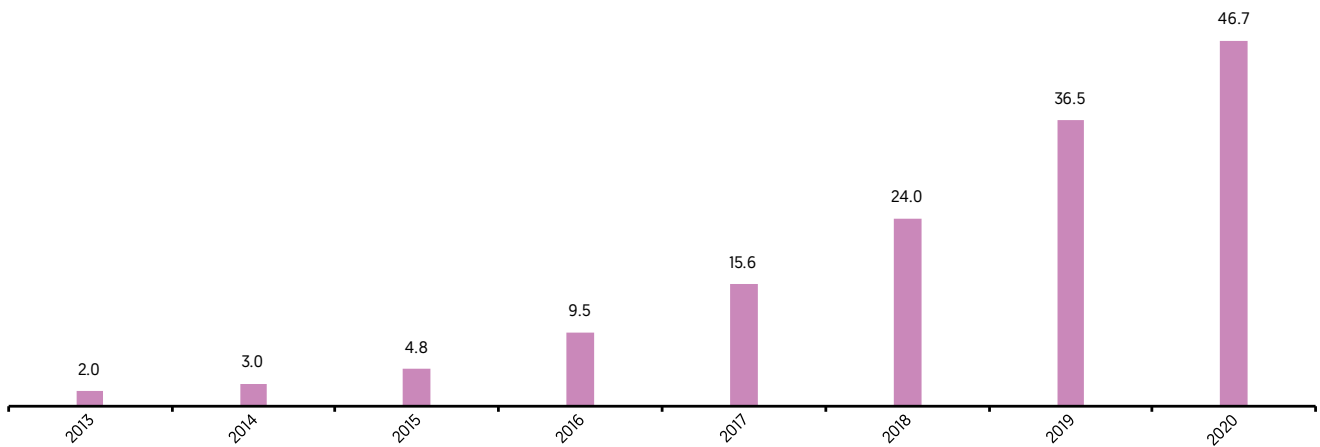
- 1 DoubleClick Bid Manager
- 2 RTB Media
- 3 C8
- 4 Programmatic Media/Get Intent
- 5 Admixer DSP

Top five sell side vendors in market (2017)

- 1 Google/ADX [ADX]
- 2 AdMixer [bsw.admixer]
- 3 OpenX [BSW]
- 4 Begun
- 5 Smaato

Source: Ukrainian AdCoalition, Zenith

Programmatic share of display advertising spend (%)



Google/DBM is the leading supplier, and most competitors sell Google's inventory via different DSPs. Absence of data has been the main barrier to entering the market, but the availability of data improved in 2017.

Programmatic growth picked up in 2016, for two main reasons. First, Google announced a partnership with local company Admixer, which allowed deals to take place in the local currency. Payments previously had to be made in US dollars, which was difficult for many local companies. Second, local companies invested more in their DSPs.

Local publishers prefer to use direct deals for their high-quality inventory, which is slowing the transition to programmatic deals.

As of 2017, open was the only type of programmatic deal available in Ukraine. Advertisers and agencies are keen to make use of private deals, but these are not available from publishers.

There is not much sign of programmatic trading moving into non-internet media. There have been a couple of minor projects in digital outdoor, though, and there may be some trials in digital TV and radio within a year or two.

Forecasts

Advertising spend (£ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total digital	5,551	6,357	7,451	8,988	10,230	11,553	12,708	13,598	14,278
Total display	1,479	1,825	2,421	3,259	3,765	4,178	4,805	5,439	5,711
Banners + other traditional display	1,279	1,515	1,979	2,495	2,677	1,413	1,614	1,496	1,256
Video	200	310	442	764	1,088	1,609	2,114	2,720	3,427
Native	-	-	-	-	-	1,156	1,076	1,224	1,028

Programmatic spend (£ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total programmatic display	237.0	511.0	1,138.0	1,911.0	2,711.0	3,072.0	3,662.7	4,285.0	4,620.9
Banners + other traditional display	-	-	-	-	1,925.0	1,658.9	1,721.5	1,799.7	1,617.3
Video	-	-	-	-	786.0	1,413.1	1,941.2	2,485.3	3,003.6
Native	-	-	-	-	-	-	-	-	-

Programmatic spend by type of deal (£ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Open (RTB)	-	-	-	-	-	1,228.8	1,281.9	1,285.5	1,155.2
All direct deals *	-	-	-	-	-	1,843.2	2,380.8	2,999.5	3,465.7

Top five buy side technology in market

- 1 DV360
- 2 TheTradeDesk
- 3 Amazon Advertising Platform
- 4 Videology
- 5 Adobe

Top five sell side vendors in market

- 1 Google Adx
- 2 Index
- 3 PubMatic
- 4 SpotX
- 5 Rubicon

Source: IAB, Zenith

* includes private marketplace, preferred deals and guaranteed

Programmatic share of display advertising spend (%)



Cost by media channel

Average programmatic CPM by media channel (US\$)

	2012	2013	2014	2015	2016	2017	2018
Overall	2.58	3.16	4.20	5.60	6.69	12.36	16.44
Display	1.91	2.31	3.42	4.36	5.15	8.35	13.71
Mobile	1.91	2.31	2.16	3.13	2.85	-	-
Video	3.43	1.60	25.79	19.90	19.96	23.74	27.41
Social	-	0.21	0.81	-	-	-	-

Average programmatic CPC by media channel (US\$)

	2012	2013	2014	2015	2016	2017	2018
Overall	2.73	1.72	2.86	3.11	4.12	4.91	4.64
Display	3.43	1.60	4.66	3.24	3.73	5.81	4.84
Mobile	3.43	1.60	1.28	1.58	2.98	-	-
Video	1.85	2.37	1.49	2.20	4.72	4.25	4.29
Social	-	1.20	2.19	-	-	-	-

Average programmatic CTR by media channel (%)

	2012	2013	2014	2015	2016	2017	2018
Overall	0.09	0.18	0.15	0.18	0.16	0.25	0.35
Display	0.06	0.14	0.07	0.13	0.14	0.14	0.28
Mobile	0.06	0.14	0.17	0.20	0.10	-	-
Video	0.06	0.14	1.73	0.90	0.42	0.56	0.64
Social	-	0.02	0.04	-	-	-	-

Source: Zenith estimates

Despite the challenges of the last 18 months, programmatic display spend continues to increase. Unsurprisingly, the smartphone is helping drive overall growth in digital advertising, while video is stealing more share from traditional display formats. In 2018, we estimate that the programmatic market will account for 76% of all digital display (incorporating social as well as video), with that number increasing to 81% by 2020. Flexibility, scalability and efficiency, from both a performance and an operations point of view, continue to help drive this expansion.

From a technology perspective, ad server activity is still dominated by Google DoubleClick, and there is a trend of consolidation on DSP offerings from all angles. We can see integration, martech and scalability playing an increasingly important part in driving adoption in different areas. The trend of moving into self-service models where resources, expertise and flexibility allow continues. Managed service tends to be the first point of call when a new offering comes into market - as we used to see from native, audio and video when they first launched - but increasingly clients

and agencies are looking for transparency, control and coordination of their activity.

We believe the share of programmatic spend made via open exchanges of real-time bidding (RTB) will decline further versus more 'direct' programmatic arrangements, including private marketplaces (PMPs) and programmatic guaranteed. Google has led the charge on the latter, allowing advertisers to access premium inventory at scale. Within the publisher community, demand, yield management, tech adoption and facilitation, and the nature of the titles continue to be factors in their success.

The adoption of programmatic techniques across more traditional channels remains in early days, and progress depends on the balance between supply and demand. While major players are establishing platforms such as DAX in radio, where supply is more limited – for example TV and OOH – we will inevitably see much slower progress in the adoption of programmatic.

Forecasts

Advertising spend (US\$ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total digital	31,338	36,983	43,722	51,662	60,394	69,234	78,275	87,311	97,539
Total display	14,856	18,533	23,377	29,370	35,764	42,412	49,050	55,700	63,337
Banners + other traditional display	10,812	13,317	16,612	20,846	25,706	30,543	35,044	38,964	43,338
Video	4,043	5,216	6,765	8,524	10,058	11,869	14,005	16,736	20,000
Native	-	-	-	-	-	-	-	-	-

Programmatic spend (US\$ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total programmatic display	2,080	5,004	12,857	19,090	26,108	33,632	40,613	47,513	54,977
Banners + other traditional display	-	4,809	12,163	15,826	19,529	24,731	29,409	33,454	37,777
Video	-	195	694	3,264	6,579	8,902	11,204	14,058	17,200
Native	-	-	-	-	-	-	-	-	-

Programmatic spend by type of deal (US\$ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Open [RTB] *	2,080	3,803	6,686	9,163	12,271	14,798	17,139	19,480	21,606
Direct **	0	1,201	6,172	9,927	13,837	18,834	23,474	28,032	33,371

Top five buy side technology in market

- 1 TradeDesk
- 2 Invite 2.0/DBM
- 3 Facebook Direct
- 4 brightroll
- 5 Amazon

Top five sell side vendors in market

- 1 AdX
- 2 AOL Video
- 3 Facebook Direct
- 4 Casale
- 5 Rubicon

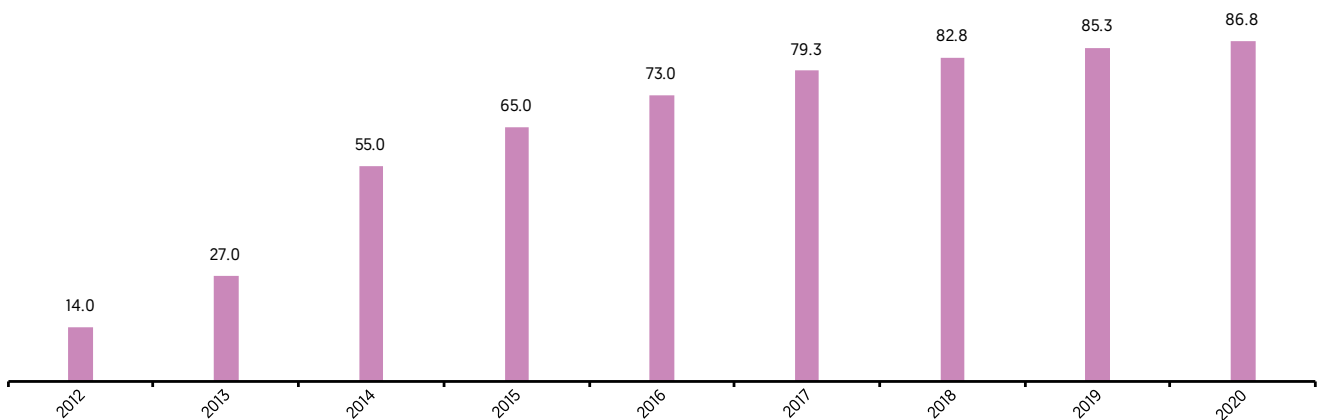
** includes preferred deals and guaranteed

Programmatic spend - emerging media channels (US\$ mill)

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Newspapers	-	-	-	-	-	-	-	-	-
Magazines	-	-	-	-	-	-	-	-	-
TV	-	-	200	410	760	1,260	2,250	3,040	-
Radio	-	-	-	-	1,400	1,700	2,400	3,850	-
Cinema	-	-	-	-	700	700	800	1,050	-
Outdoor/transport	-	-	-	-	1,900	2,100	3,100	5,250	-

Source: Zenith

Programmatic share of display advertising spend (%)



Cost by media channel

Average programmatic CPM by media channel (US\$)

	2012	2013	2014	2015	2016	2017	2018
Overall	1.24	1.02	1.58	2.75	3.75	21.59	4.89
Display	1.86	1.74	1.97	3.33	4.13	4.98	4.86
Mobile	1.86	1.74	1.60	2.10	4.65	5.73	5.08
Video	2.92	4.67	11.53	15.04	10.76	21.64	12.33
Social	-	0.59	1.26	2.00	2.23	3.72	2.41

Average programmatic CPC by media channel (US\$)

	2012	2013	2014	2015	2016	2017	2018
Overall	1.14	0.67	0.49	0.44	0.93	6.43	1.60
Display	2.92	4.67	2.98	4.55	5.69	5.35	5.19
Mobile	2.92	4.67	0.32	0.58	1.77	3.00	3.19
Video	1.20	1.34	3.20	5.36	4.67	5.63	3.38
Social	-	0.30	0.27	0.20	0.30	0.49	0.30

Average programmatic CTR by media channel (%)

	2012	2013	2014	2015	2016	2017	2018
Overall	0.11	0.15	0.32	0.62	0.40	0.34	0.30
Display	0.06	0.04	0.07	0.07	0.07	0.09	0.09
Mobile	0.06	0.04	0.51	0.36	0.26	0.19	0.16
Video	0.06	0.04	0.36	0.28	0.23	0.38	0.36
Social	-	0.20	0.47	1.01	0.73	0.76	0.81

Source: Zenith estimates

Adoption of programmatic technology in the US is extremely advanced. Ad servers, SSPs, DSPs and DMPs are all commonly used today, with a healthy number of competitive options available. Technologies like DCO [Dynamic Creative Optimisation], as well as channel specific technologies - such as video ad servers in the CTV [connected TV] market, audio-focused DSPs and SSPs, and DOOH exchanges - are also available and seeing increased adoption.

Awareness of programmatic trading is substantial, with frequent discussion of programmatic topics in the industry press and trade conferences. However, there remains a shortage of people with in-depth expertise on the subject. Publicis Media is working hard to educate our agency teams and clients through in-person training sessions, a recurring programmatic webinar series, and an internal self-learning portal. The appetite for this content remains strong.

Continued agency education and client awareness is paramount to driving adoption of programmatic marketing, particularly the emerging opportunities of programmatic TV, programmatic audio, and DOOH. Agencies need to feel confident in pitching programmatic as part of a wider media plan, and clients need to understand the full range of opportunities afforded by programmatic marketing.

Growth in programmatic spend continues to be strong. This is due to a number of factors, including a shift away from traditional ad networks toward programmatic partners; the development of new programmatic channels, such as programmatic audio, connected TVs, and digital out of home; and the continued development of premium inventory access, through the use of private marketplace and programmatic guaranteed deals.

Managed service offers continue to play a role in the US market. Publicis Media encourages clients to run through a self-service model due to the improved efficiency and performance we have observed on a campaign-by-campaign basis through log level reporting. However, in some situations we have seen clients continue to spend on managed service offerings, typically when one of the following takes place:

- Clients are looking for a guaranteed outcome that may be difficult to obtain (for example, guaranteed CPLs for mobile app download campaigns).

- Client mandates, usually due to a pre-existing relationship or historically strong performance from a vendor.
- Clients that begin in-housing campaigns, but do not have the full resources needed to manage campaigns internally.

Open exchange buying remains common, but we have seen an increased focus on PMP deals over the past year. We are also seeing programmatic guaranteed buying evolve from an experimental option into a more standard opportunity for a number of clients. We expect to see more growth in the near future as the technology develops. We anticipate that client concerns over site quality will continue to drive growth in PMP and programmatic guaranteed deals.

Publishers in the US continue to expand their support for programmatic buying. Many publishers have restructured their sales teams to align direct sales more closely with programmatic sales, leading new PMP and programmatic guaranteed opportunities. In addition, header bidding has been widely embraced by the publishing community in North America, driving additional growth. However, this trend has also added a substantial amount of complexity to the buying ecosystem, leading to an increase in the use of 1st price auctions, a push toward PMP and programmatic guaranteed activation, and new trends like supply path optimization.

Adoption of programmatic technology in traditional media channels continues to be low relative to the total budgets in these channels. However, over the past year we have seen significant steps taken that we believe will help drive adoption over the next few years. A number of key technology vendors, from DSPs to SSPs to ad servers, have released new products that have improved buyers' access to programmatic TV, programmatic audio, and DOOH inventory. Publishers have also begun offering more premium content programmatically, which has increased the appeal of these offers dramatically. As these trends continue, we believe that agency teams will incorporate more of these assets into their media plans.

Programmatic Marketing Forecasts 2018

£345

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