

Data Management Platforms: An Empirical Taxonomy

34th Bled eConference 2021

Agenda



1 Motivation

2 Real-Time Bidding Systems

3 Research Question

4 Method

5 Findings

6 Learnings and Future Research

Motivation



Increasing availability of raw data

Due to the digitalization of everyday life and increasing use of digital devices.



Increasing investments in targeted advertising

The practice of displaying advertisements specifically to the audience that is likely to engage.



Real-Time Bidding Systems as enablers

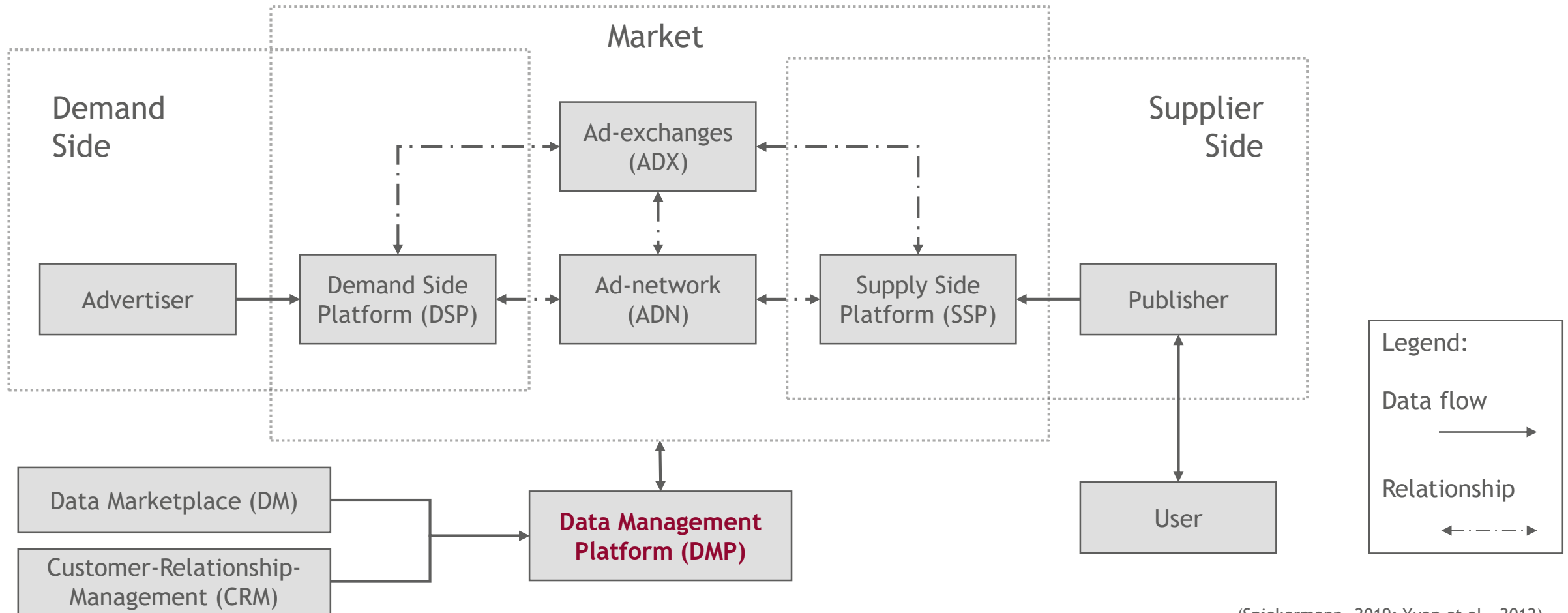
Comprise multiple actors, whose interplay permits the dynamic placement of advertisements targeted to specific users.



Data Management Platforms

Information systems used to manage consumers' data that is collected, for instance, through online tracking.

DMPs in Real-Time Bidding Systems



(Spiekermann, 2019; Yuan et al., 2012)

Research Question



How can we distinguish the functionalities of Data Management Platforms?
What are the discriminating characteristics?

Method



Taxonomy Development

- Following Nickerson et al. (2013) **iterative** approach of building a taxonomy
 - **Deductive** from literature
(Kamps & Schetter, 2018; Wang et al. 2017)
 - **Inductive** from existing DMPs
(Adobe, 2020; Google, 2020; Lotame, 2020; Oracle, 2020b)
- **Six iterations** - determined by subjective and objective termination conditions specified by Nickerson et al. (2013)

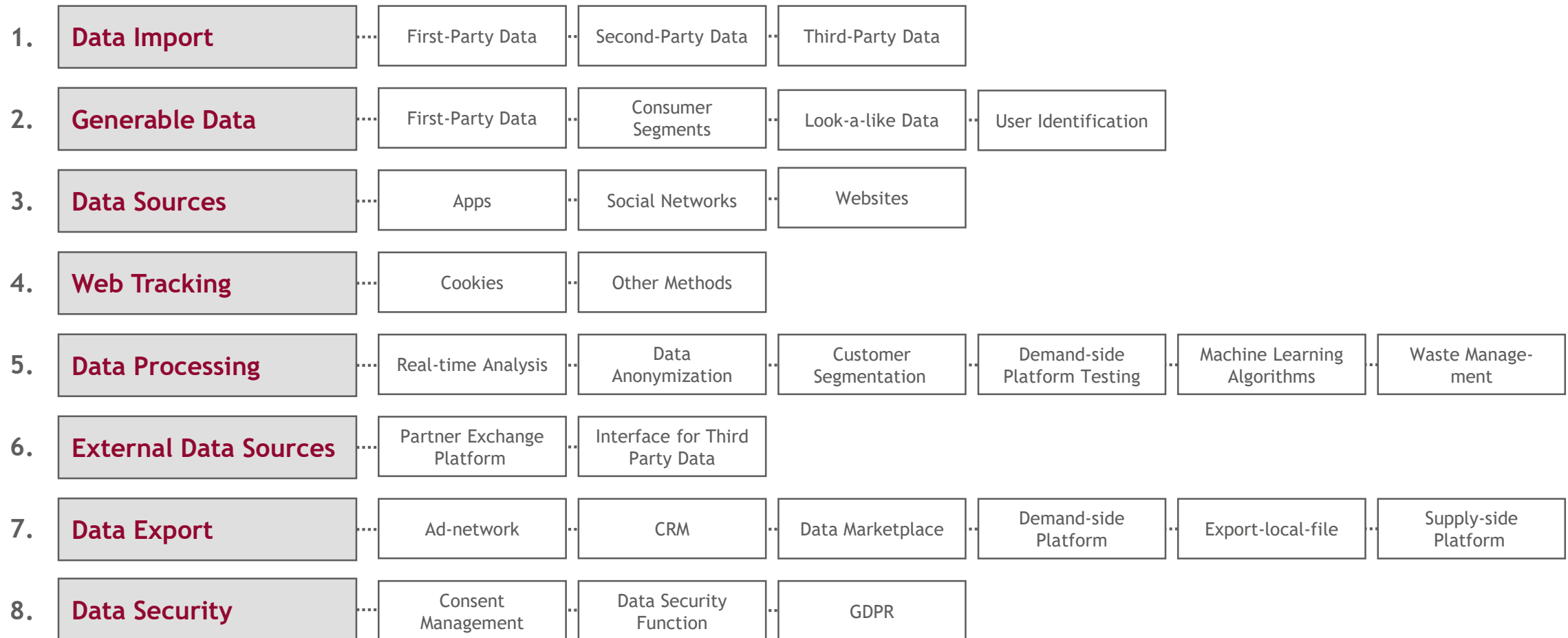


Taxonomy Evaluation

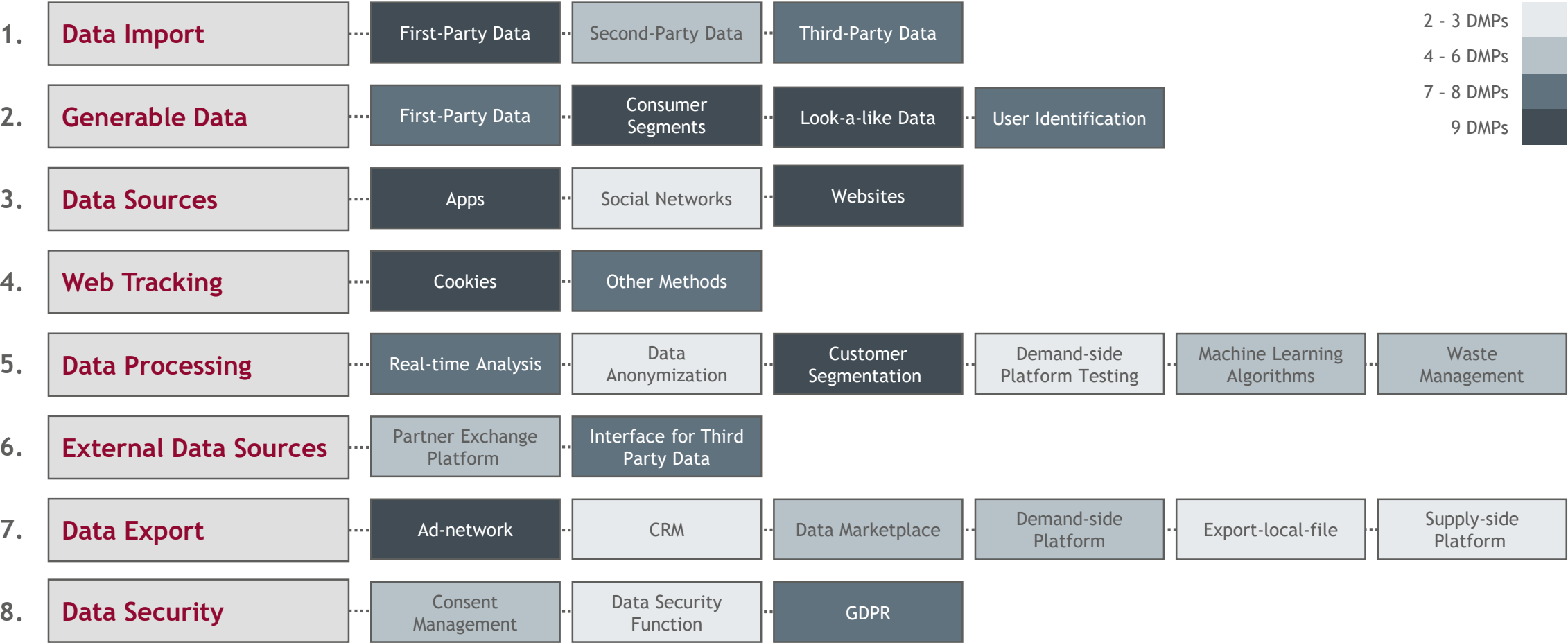
- Nine DMPs that meet the specified requirements in terms of
 - **Feasibility** - amount of information available
 - **Relevance** - annual revenue
 - **Popularity** - number of clients and awards
- Information for applying the taxonomy was gathered from **official information sources** (public websites, customer support)



Taxonomy



Taxonomy Evaluation



Learnings



Customer Segmentation

Customer segmentation as **highly relevant** function of DMPs.

Prerequisite for targeted commercial and political advertising, and personalized price discrimination.

Regular Cooperation

Vendors cooperate (e.g., Salesforce and Google) to offer valuable services to customers.

DMP's cooperate with **other actors** in the RTBS to enable targeted advertising.

Quality and Quantity

Bad data **quality** (inconsistent, inaccurate) can lead to wrong cluster assignments.

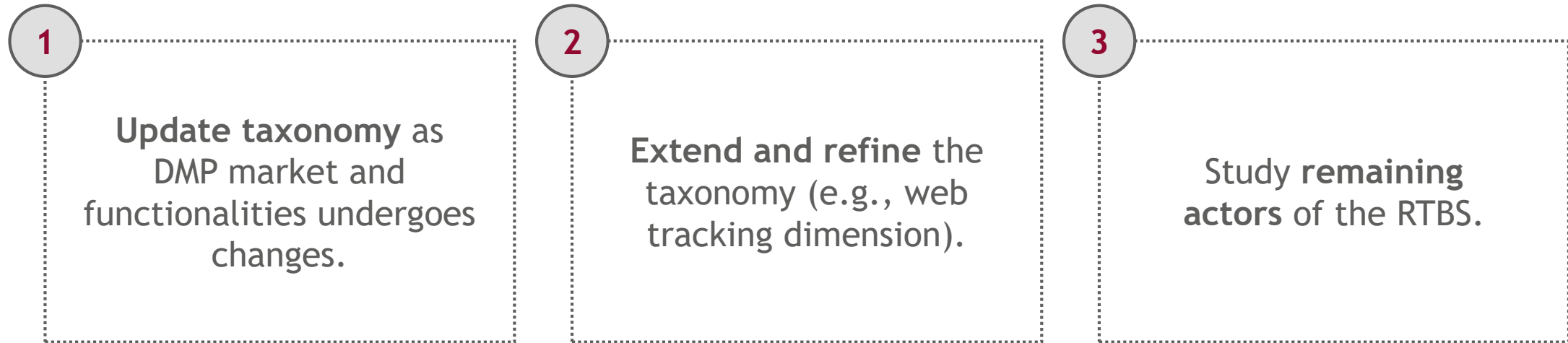
More data enables more fine-grained consumer profiles.

Double-edged Sword

Provide value by supporting the provision of **relevant advertisement** for consumers

but contribute to the efficient distribution of **harmful, distorted or fake content**.

Conclusion & Future Work



→ DMP as central building block for targeted advertising that has not been sufficiently explored.

Thanks for listening

... and your thoughts on Data Management Platforms!



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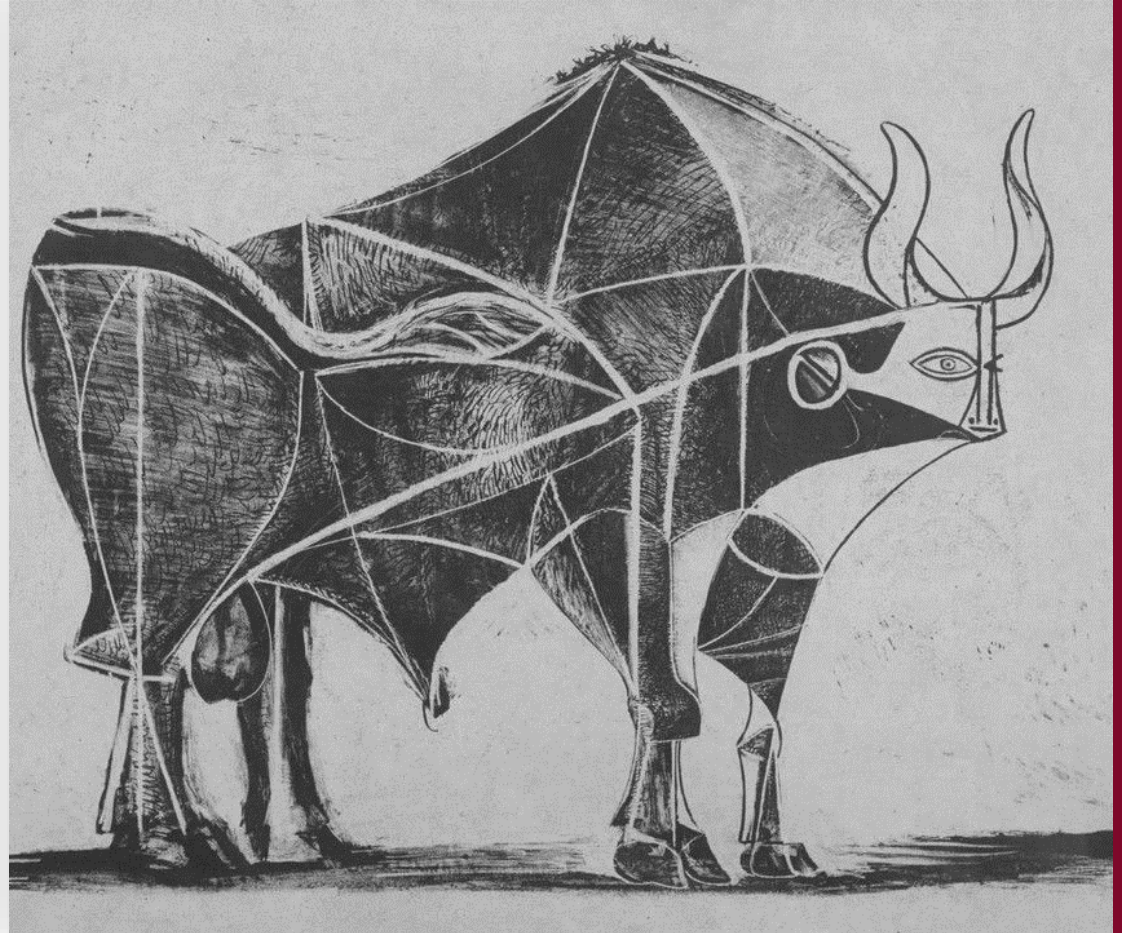


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Backup Slides



Taxonomy Evaluation (detailed)



Taxonomy		Evaluation									
Dimension	Characteristics	A	G	L	M	Ne	Ni	O	S	T	
Data Import ^{B,C}	First-Party Data ^{A,B,C,D,E}	x	x	x	x	x	x	x	x	x	
	Second-Party Data ^{A,C,D,E}	x		x		x		x	x		
	Third-Party Data ^{A,B,C,D,E}	x	x	x	x	x		x	x		
Generable Data ^{C,D,F,G}	First-Party Data ^{A,B,C,D,E,G}	x	x	x	x	x	x	x	x		
	Consumer Segments ^{A,B,C,D,E,G}	x	x	x	x	x	x	x	x	x	
	Look-a-like Data ^{A,B,D,E}	x	x	x	x	x	x	x	x	x	
	User Identification ^{A,B,D,E,G}	x	x	x	x	x	x	x	x		
Data Sources ^{C,D,F,G}	Apps ^{A,B,D,E}	x	x	x	x	x	x	x	x	x	
	Social Networks ^{D,E}			x			x	x			
	Websites ^{A,B,D,E,G}	x	x	x	x	x	x	x	x	x	
Web Tracking ^{C,D,G}	Cookies ^{A,B,C,D,E}	x	x	x	x	x	x	x	x	x	
	Other Methods ^{A,B,E}	x	x		x	x		x	x	x	
Data Processing Functions ^{A,B,C,F,G}	Real-time Analysis ^{B,C,D,E,G}	x	x	x	x	x	x	x	x		
	Data Anonymization ^{B,D}	x	x	x							
	Data Segmentation ^{B,C,D,E,G}	x	x	x	x	x	x	x	x	x	
	Demand-side Platform Testing ^{A,B}	x	x								
	Machine Learning Algorithms ^{A,B,D}	x	x		x	x	x		x		
	Waste Management ^{D,E}	x		x		x		x			
External Data Sources ^D	Partner Exchange Platform ^{A,B,D,E}	x	x	x				x			
	Interface for Third Party Data ^{A,B,D,E}	x	x	x	x	x	x	x			
Data Export ^{C,F,G}	Ad-network ^{A,B,C,D,E,G}	x	x	x	x	x	x	x	x	x	
	Customer Relationship Management ^{B,D}		x	x							
	Data Marketplace ^{A,E}	x				x		x		x	
	Demand-side Platform ^{A,C,D,E,G}	x		x	x	x		x		x	
	Export-local-file ^{A,B}	x	x								
	Supply-side Platform ^{C,D}			x		x				x	
Data Security ^F	Consent Management ^{D,E,F}			x		x		x	x	x	
	Data Security Function ^{A,B,F}	x	x			x					
	GDPR ^{A,B,D,E,F}	x	x	x		x		x	x	x	

Sources: Adobe^A, 2020; Google^B, 2020; Kamps & Schetter^C, 2018; Lotame^D, 2020; Oracle^E, 2020; Schonschek^F, 2020; Wang et al. ^G, 2017

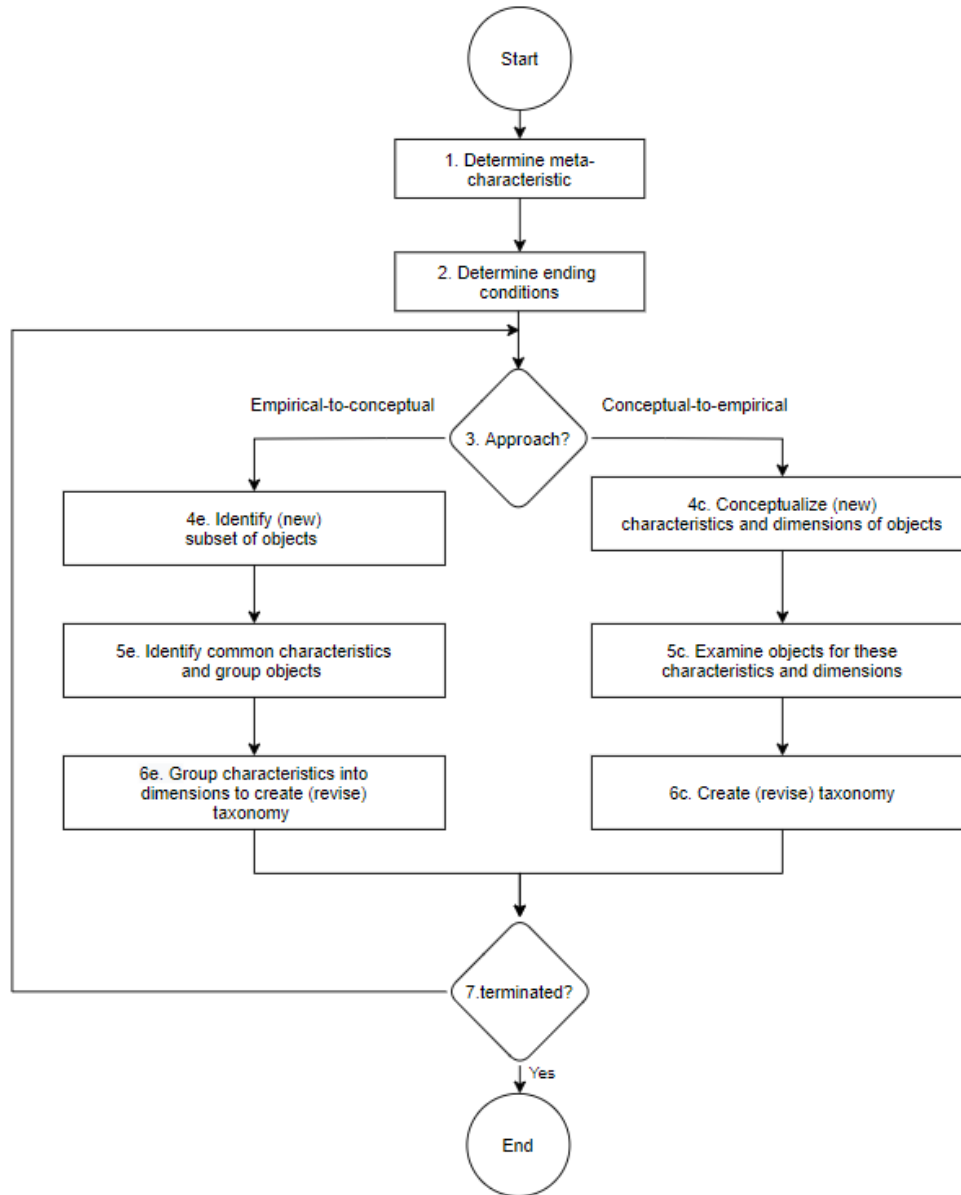
Taxonomy Evaluation Sample



DMP	Relevance		Feasibility		Popularity	
	Year	Revenue	Info	Trial	Clients	Awards
Adobe	2019	11,7 B	+	+	148	Gartner
Google Audience	2020	160,74 B	+	-	-	Gartner
Lotame	2020	14,25 M	+	+	> 8	FW
MediaMath	2020	104,7 M	+	-	-	Gartner & FW
Nielsen	2018	6,5 B	+	-	-	FW
OneID von Neustar	2017	1,2 B	+	-	> 75	FW
Oracle DMP	2019	39,5 B	+	-	6	FW
Salesforce DMP	2020	17,1 B	+	+	> 150k	FW
The Trade Desk	2018	447 M	+	Video	10	Gartner

(Andrew et al., 2020; Dun & Bradstreet, 2020; Moffett & Chien, 2019)

Nickerson Method



(Nickerson et al. 2013)

Subjective Ending Conditions



Subjective Ending Condition	Question	Out Study
Conciseness	Does the number of dimensions allow the taxonomy to be meaningful without being unwieldy or overwhelming?	Eight dimensions is appropriate because it falls in the range of seven plus or minus two (Miller, 1956).
Robustness	Do the dimensions and characteristics provide for differentiation among objects sufficient to be of interest?	Taxonomy includes elementary functions that DMPs can but must not have.
Comprehensiveness	Can all objects or a (random) sample of objects within the domain of interest be classified?	We tested the taxonomy on nine DMPs and could classify all.
Extensibility	Can a new dimension or a new characteristic of an existing dimension be easily added?	Easy structure without any subdimensions in place.
Exploitability	What do the dimensions and characteristic explain about an object?	The taxonomy explains what constitutes a DMP and its focus.

(Nickerson et al., 2013)

Objective Ending Conditions



No dimension or characteristic was merged or split in the last iteration.

Each dimension was unique and did not repeat.

Each characteristic was unique within its dimension.

(Nickerson et al., 2013)