



# DPM concepts and taxonomy

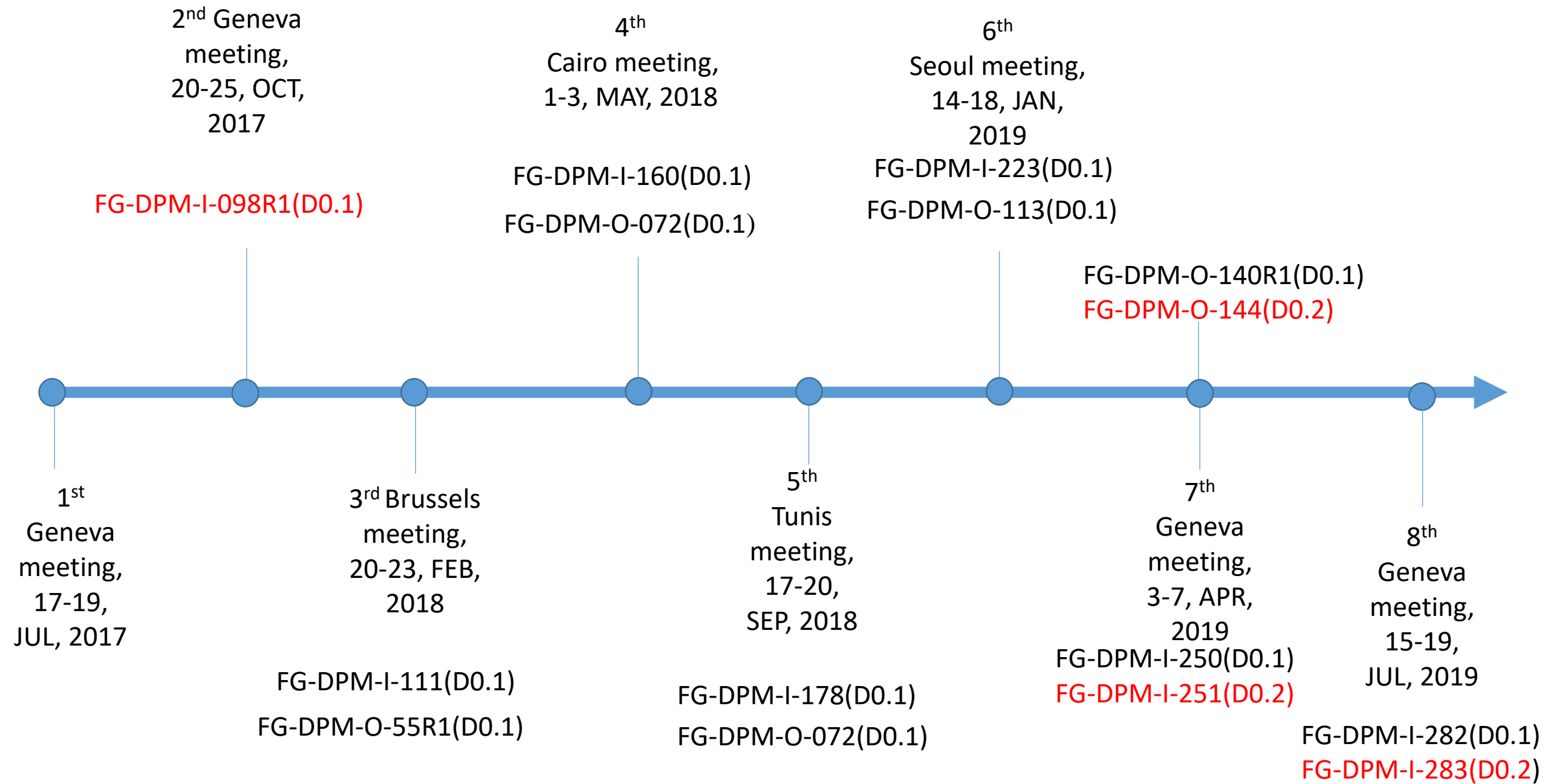
Xiaomi An and Wei Wei  
Renmin University of China

The Eighth FG-DPM meeting, Geneva, 15 to 19 July 2019  
The Fourth ITU Workshop on Data Processing and Management for IoT and Smart Cities and Communities 19, 2019

# Contents

1. Review of the evolution and development of DPM DO.1 and D0.2
2. Overview of methodology for DPM concepts building
3. Overview of DPM concepts building
4. Uses of DPM concepts (DPM-I-282/DPM-O-172, DPM-I-283)

# Timeline of D0.1 and D0.2 work



# Evolution of D0.1 work

Start point for D0.1;

Contains **26 basic terms** developed by analysing the data processing and data management;

The initial conceptual system is built based on DCC model with **5 sections** for taxonomy

**30 heavily important terms** Checking with output documents from the meeting

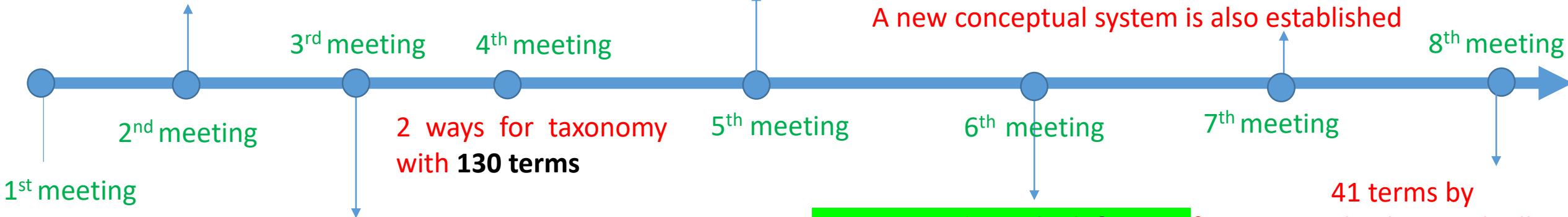
D0.1 divided into D0.1 and D0.2;

**196 terms** in D0.1 extended by checking with all deliverables in Seoul meeting and 17 use cases;

The terms are categorised into **8 dimensions** with a series of concept relationship systems;

In the output document, the number of the terms is changed from **196 to 30** selected by a set of criteria; The taxonomy is modified into **5 dimensions** for mapping with DPM framework;

A new conceptual system is also established



**134 terms** extended from **26** by checking with use case template;

The several principles are established;

The terms contain **multiple definitions** as NOTE format;

There are **9 sections** for taxonomy;

**136 terms** checking from **191 terms** based on **six steps** in the output document;

An integrated digital continuity framework established

**72 terms with single definition** for recommendation selected from 12 use cases in input document;

Terms are categorised into **7 sections**;

**176 terms** by checking with **27 output documents** from Tunis meeting in output document;

The taxonomy was changed into new 8 sections.

**41 terms** by checking with all WGs with latest version and also get consensus through WGs e-meetings;

The concept system is updated

# Review of evolution and development of DPM contributions (D0.1 and D0.2)

Formal meetings held	Contributions	Number of terms and Taxonomy dimensions
1 <sup>th</sup> Geneva meeting, 17-19, JUL, 2017	N/A	
2 <sup>th</sup> Geneva meeting, 20-25, OCT, 2017	FG-DPM-I-098R1(D0.1)	Initial one contained 26 terms
3 <sup>th</sup> Brussels meeting, 20-23, FEB, 2018	FG-DPM-I-111(D0.1)	134 terms 9 sections: data; data types; data; data types; data attributes; data format; data processing; data process system and enablers; data management activities and processes; data applications and settings; data ecosystem and life cycle governance.
3 <sup>th</sup> Brussels meeting, 20-23, FEB, 2018	FG-DPM-O-55R1(D0.1)	136 terms 9 sections: data; data types; data; data types; data attributes; data format; data processing; data process system and enablers; data management activities and processes; data applications and settings; data ecosystem and life cycle governance.
4 <sup>th</sup> Cairo meeting, 1-3, MAY, 2018	FG-DPM-I-160(D0.1)	130 terms 7 sections: data; data attributes; data types; data processing; data system; data management; data application; data governance
4 <sup>th</sup> Cairo meeting, 1-3, MAY, 2018	FG-DPM-O-072(D0.1)	130 terms 7 sections: data; data attributes; data types; data processing; data system; data management; data application; data governance
5 <sup>th</sup> Tunis meeting, 17-20, SEP, 2018	FG-DPM-I-178(D0.1)	30 terms and questionnaire for agreement on those terms
5 <sup>th</sup> Tunis meeting, 17-20, SEP, 2018	FG-DPM-O-072(D0.1)	130 terms 7 sections: data; data attributes; data types; data processing; data system; data management; data application; data governance
6 <sup>th</sup> Seoul meeting, 14-18, JAN, 2019	FG-DPM-I-223(D0.1)	72 terms mapping with 12 use cases
6 <sup>th</sup> Seoul meeting, 14-18, JAN, 2019	FG-DPM-O-113(D0.1)	176 terms 8 dimensions: data governance; data economy; blockchain; data; process; system; management; applications
7 <sup>th</sup> Geneva meeting, 3-7, APR, 2019	FG-DPM-I-250(D0.1)	194 terms
	FG-DPM-I-251(D0.2)	8 dimensions: data governance; data economy; blockchain; data; process; system; management; applications
7 <sup>th</sup> Geneva meeting, 3-7, APR, 2019	FG-DPM-O-140R1(D0.1)	30 terms
	FG-DPM-O-144(D0.2)	5 dimensions: DPM governance; Data Ecosystem; Data Trust; Data Lifecycle; Data Commercialisation
8 <sup>th</sup> the Geneva meeting, 16-19, JULY, 2019	FG-DPM-O-172 (D0.1)	41 terms
	FG-DPM-I-283 (D0.2)	5 dimensions: DPM governance; Data Ecosystem; Data Trust; Data Lifecycle; Data Commercialisation, 38 terms

**Overview of methodology for DPM concepts  
building (DPM-I-283)**

# Definition of methodology

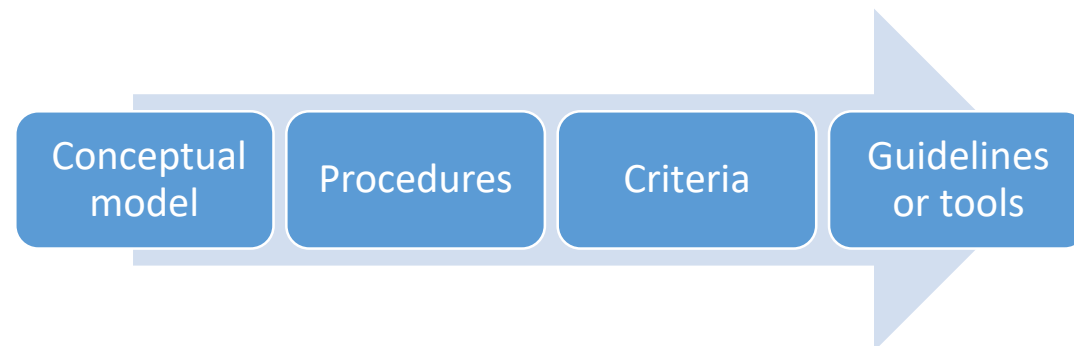
- The establishment of the methodology aims to build the conceptual model to encourage a mutual and consistent understanding of, and a coherent approach to, the activities relating to DPM, and the use of uniform terminology

Methodology: A **coherent, integrated set of methods** from which a coherent sub-set can be selected for particular applications. A **methodology should contain at least four components:**

1. a **conceptual model of constructs essential to the problem,**
2. a **set of procedures suggesting the direction and order to proceed,**
3. a **series of guidelines identifying things to be avoided, and**
4. a **collection of evaluative criteria for assessing the quality of the product.**

(ISO/IEC 16500-8:1999, 3.14)

- Note1: Methodology can refer to set of instructions (e.g. provided through text, computer programs, tools) that is a step-by-step aid to the user (ISO 15704:2000 3.14; ISO 19439:2006, 3.45)
- Note2: Methodology can also refer to specific set of means or procedures used in attaining an end ( ISO 14813-5:2010, B.185)
- Note 3: Methodology can refer to collection of standards, procedures and supporting methods that define the complete approach to the development of a product or system ( ISO/IEC 21827:2008, 3.22)



# Contents of D0.2 (DPM-I-283)

## Table of Contents

- [1 Scope](#)
- [2 References](#)
- [3 Terms and Definitions](#)
  - [3.1 Terms defined elsewhere](#)
  - [3.2 Terms defined in this Technical Report](#)
- [4 Abbreviations](#)
- [5 Methodology of DPM concept building](#)
  - [5.1 General](#)
  - [5.2 Methods for DPM concept building](#)
  - [5.3 Principles of DPM concept building](#)
  - [5.4 Process of DPM concept building](#)
  - [5.5 Rules for DPM concept building](#)
  - [5.6 Evaluation criteria for assessment of the DPM concepts](#)
  - [5.7 Basic DPM concepts to support IoT and SC&C](#)



# Principles of DPM concept building

## **The terms used in the context of DPM need to be:**

- highly relevant and pertinent to DPM for support IoT and SC&C; highly relevant to reaching and clarity and consensus in DPM for support IoT and SC&C; in frequent use and applicable throughout all DPM deliverables;
- Definitions must be accurate, clear and positive. Inaccurate and negative definitions are not acceptable. Nor should definitions be circular or include, or paraphrase, the term being defined. The language used in a definition must either be common English language terms or defined elsewhere in the text;
- the associated definitions must be able to stand alone. In other words, the meaning should be understandable without requiring reference. This is particularly important since the terms and definitions are being extracted for use by delegates, and consumers on the web.

## **The terms to not used in the context of DPM concern terms which:**

- are not pertinent to the DPM in support of IoT, SC &C and which are unlikely to be relevant in the future;
- are not in frequent use;
- may have different interpretations, where there is no consensus, and which are therefore likely to cause confusion or conflicts, contradictions or inconsistency;
- criteria for not selecting terms are subjective and partial. If a definition of a concept is controversial, but is a core concept, should be included.

# Sources investigated

- ITU Standards Landscape for IoT & Smart Sustainable Cities at <https://www.itu.int/net4/ITU-T/landscape#?topic=0.78&workgroup=1>
- IEC/ISO/ITU Smart City Coordination Task Group: 2019 Draft White Paper: *Suggested Priority Terms in Need of Common Definitions to Support Standards Activities for Smart city, Barcelona, World Smart City Forum, April 17, 2019.*
- IEC Electropedia: at <http://www.electropedia.org/>
- ISO Online Browsing Platform at <http://www.iso.org/obp>
- Industrial IoT terms at <https://www.iiconsortium.org/vocab/index.htm>
- SEVOCAB: Software and Systems Engineering Vocabulary at [https://pascal.computer.org/sev\\_display/index.action](https://pascal.computer.org/sev_display/index.action)
- SF-SSCC: Sector Forum for Smart and Sustainable Cities and Communities Overview of Standards and Specifications relevant to Smart Cities at [ftp://ftp.cencenelec.eu/EN/EuropeanStandardization/Fields/SmartLiving/City/SF-SSCC\\_Overview\\_of\\_Standards\\_for\\_SmartCities.pdf](ftp://ftp.cencenelec.eu/EN/EuropeanStandardization/Fields/SmartLiving/City/SF-SSCC_Overview_of_Standards_for_SmartCities.pdf)
- UNBIS: United Nations Bibliographic Information System terms at <https://lib-thesaurus.un.org/LIB/DHLUNBISThesaurus.nsf/MultiEng/85759FD34196A99A85256AA0005FBD0B?OpenDocument>

# DPM dimensions relevance assessment

DPM dimensions relevance	Highly relevant	Relevant	Neutral	Unknown
governance				
ecosystem				
Data trust				
Data lifecycle				
Data commercialisation				

# DPM stakeholders relevance assessment

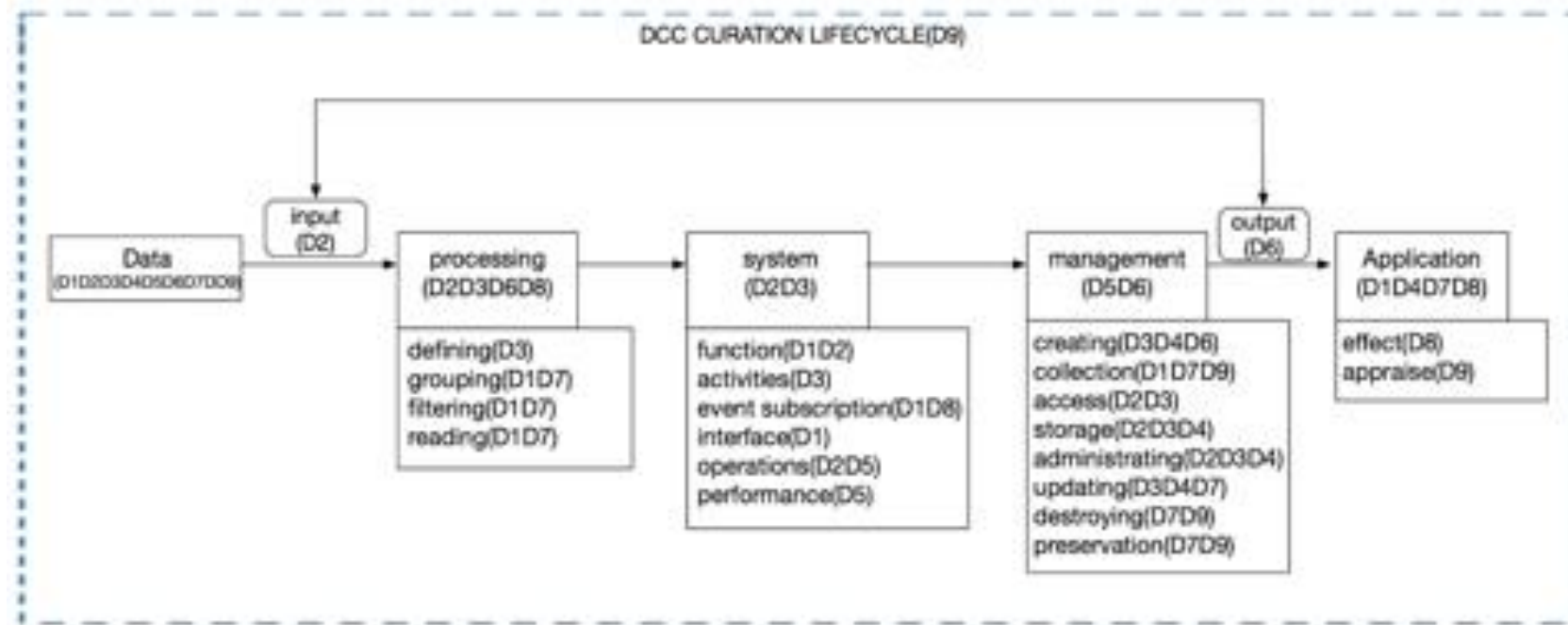
DPM stakeholders relevance	Highly relevant	Relevant	Neutral	Unknown
The citizen and society;				
The city authorities and city governance bodies;				
The industry and local business				

# **Overview of DPM concepts building**

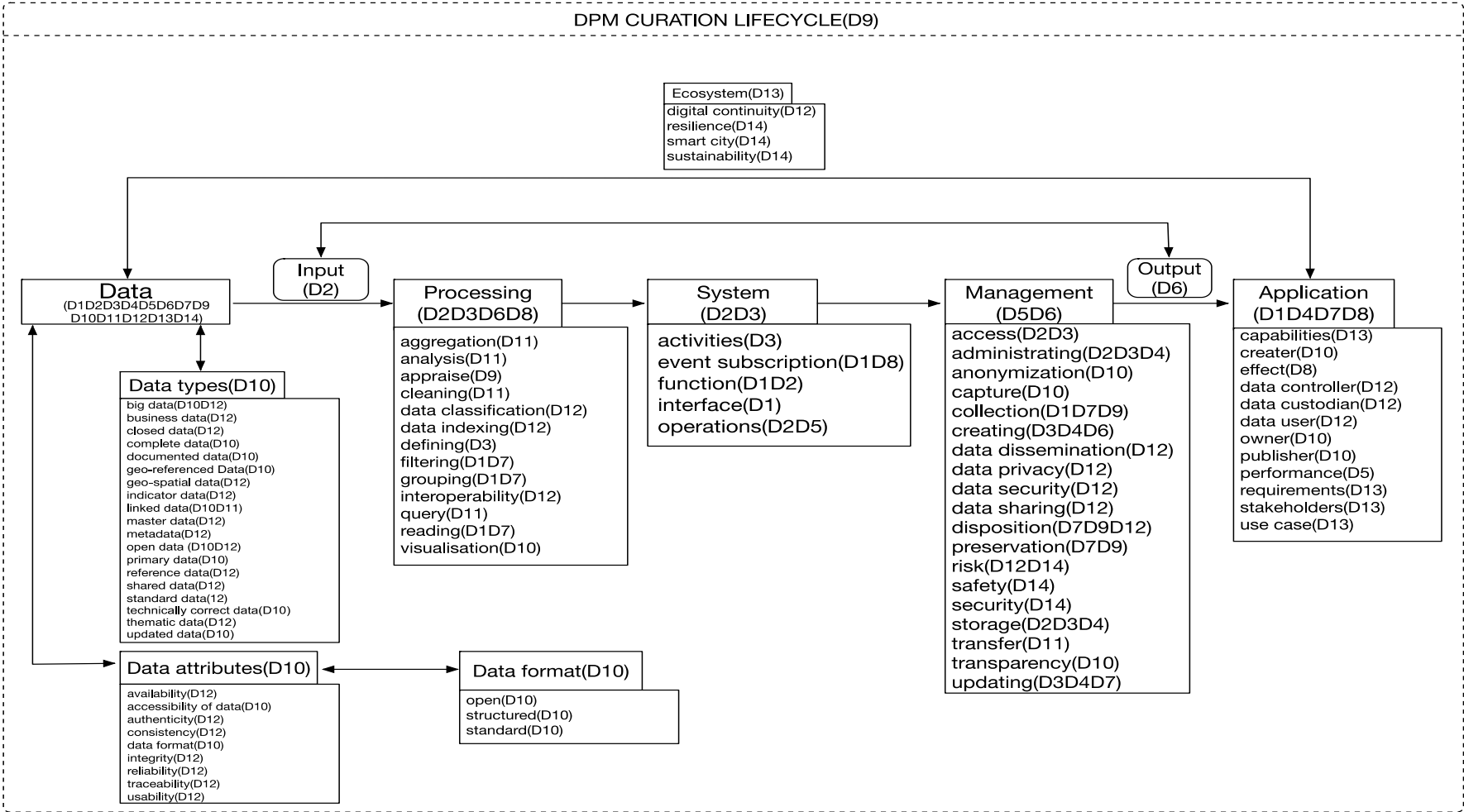
# FG-DPM-I-098R1

## In 2<sup>nd</sup> Geneva meeting, 20-25, OCT, 2017

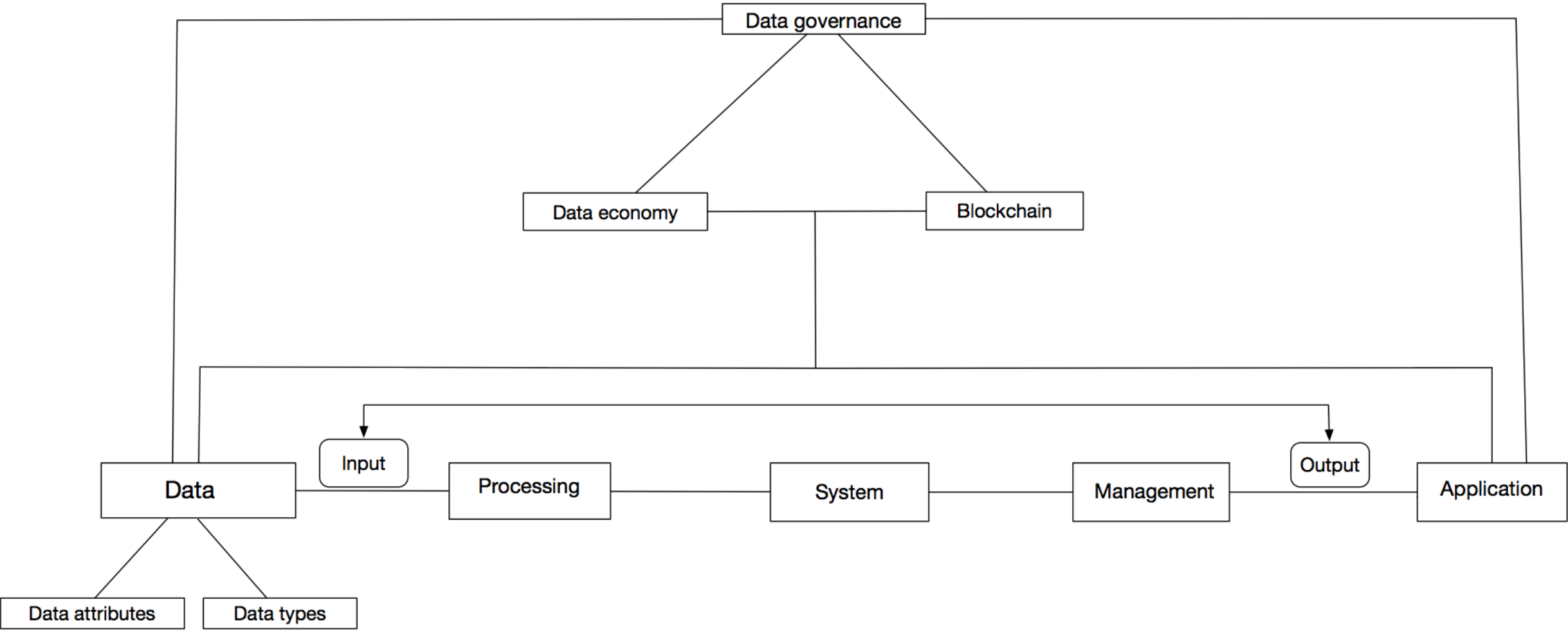
- Initial version
- Contains **26 basic terms** by analyzing the terminology of data processing and data management
- Based on DCC model for DPM taxonomy
- Categorized into **5 sections** such as data; processing; system; management; application



# Conceptual framework of DPM taxonomies with extension of DCC lifecycle mode

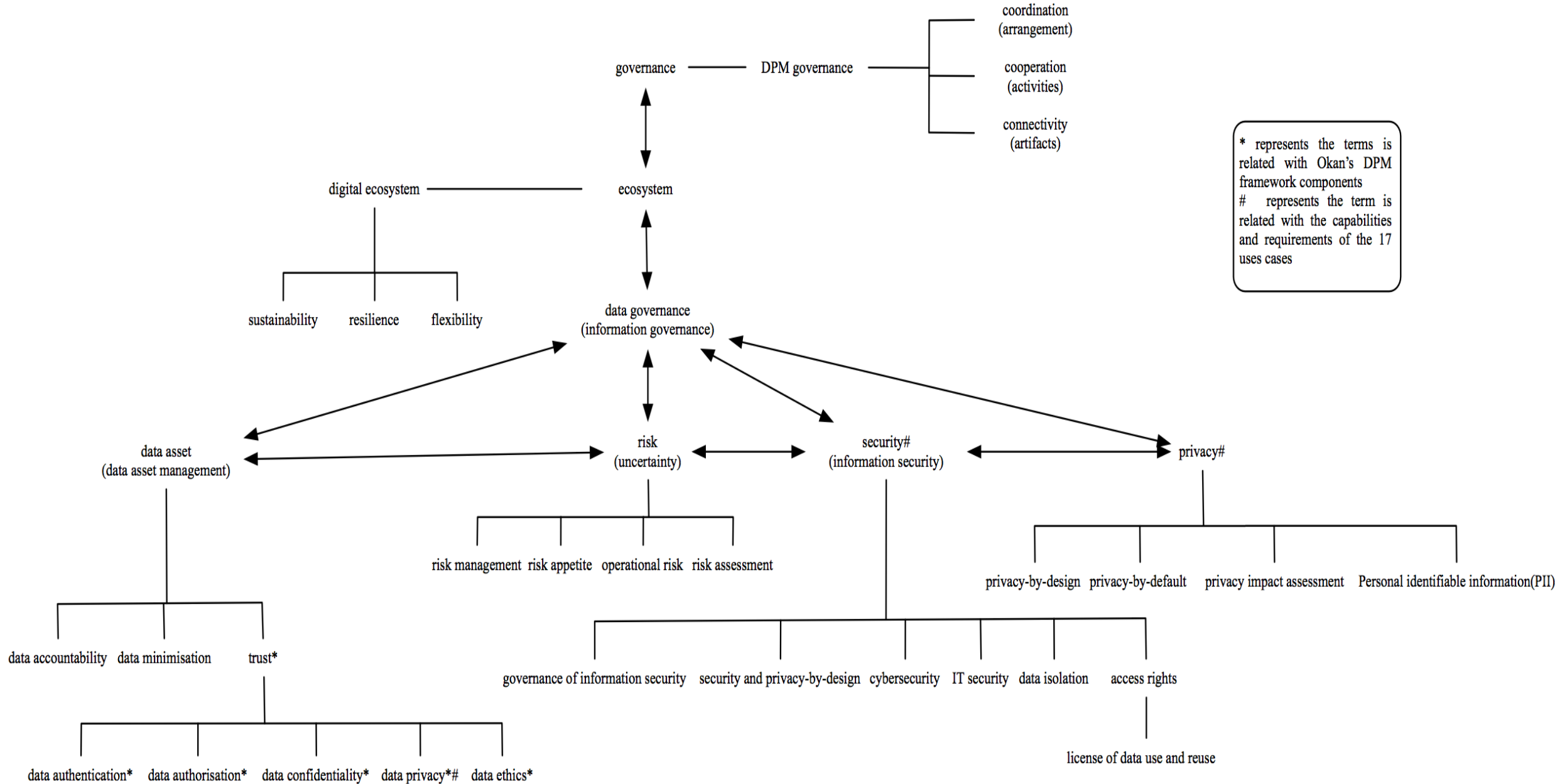


Updated DPM taxonomies mapping with all the deliverables  
(194 terms and their relationships **from 8 dimensions**, FG-DPM-I-251)

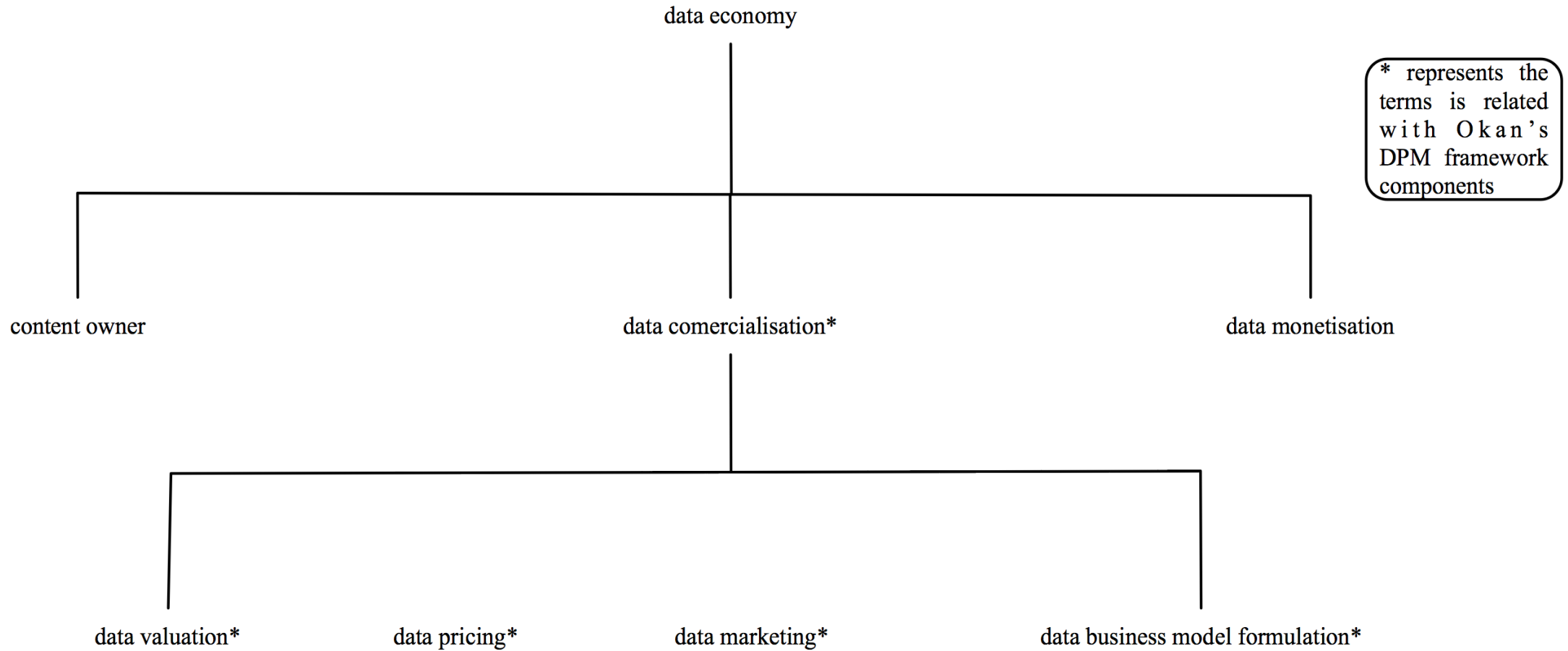




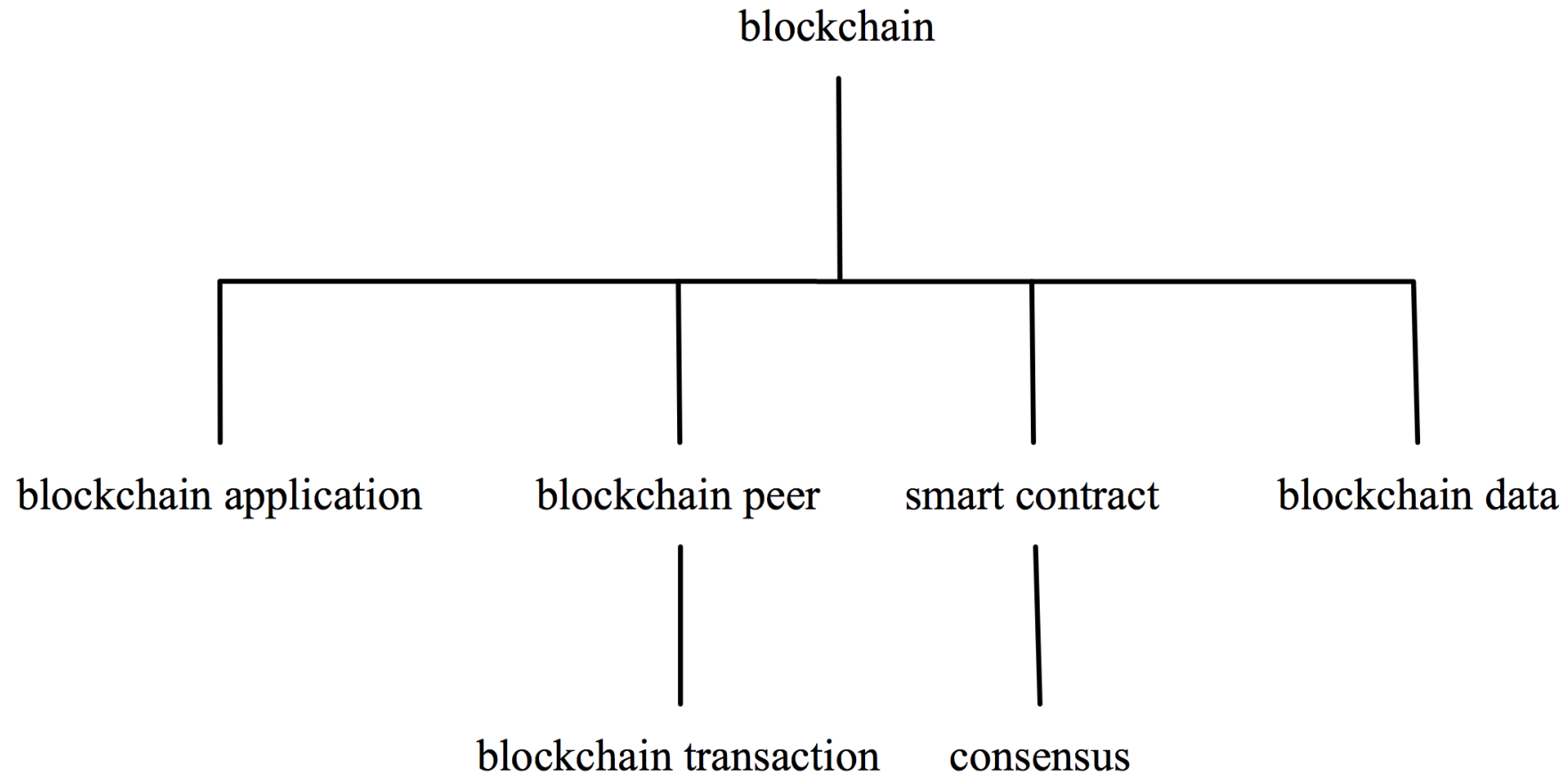
# Concepts of the class “data governance” and related concepts



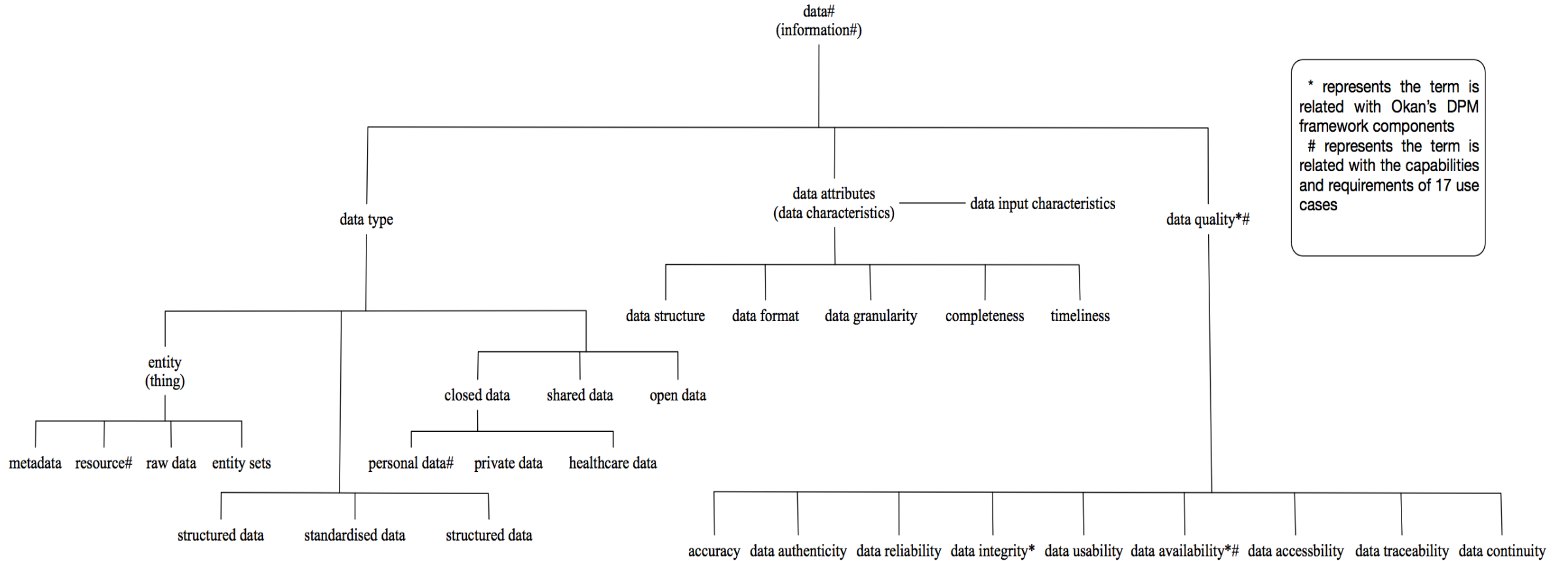
# Concepts of the class “data economy” and related concepts



# Concepts of the class “blockchain” and related concepts

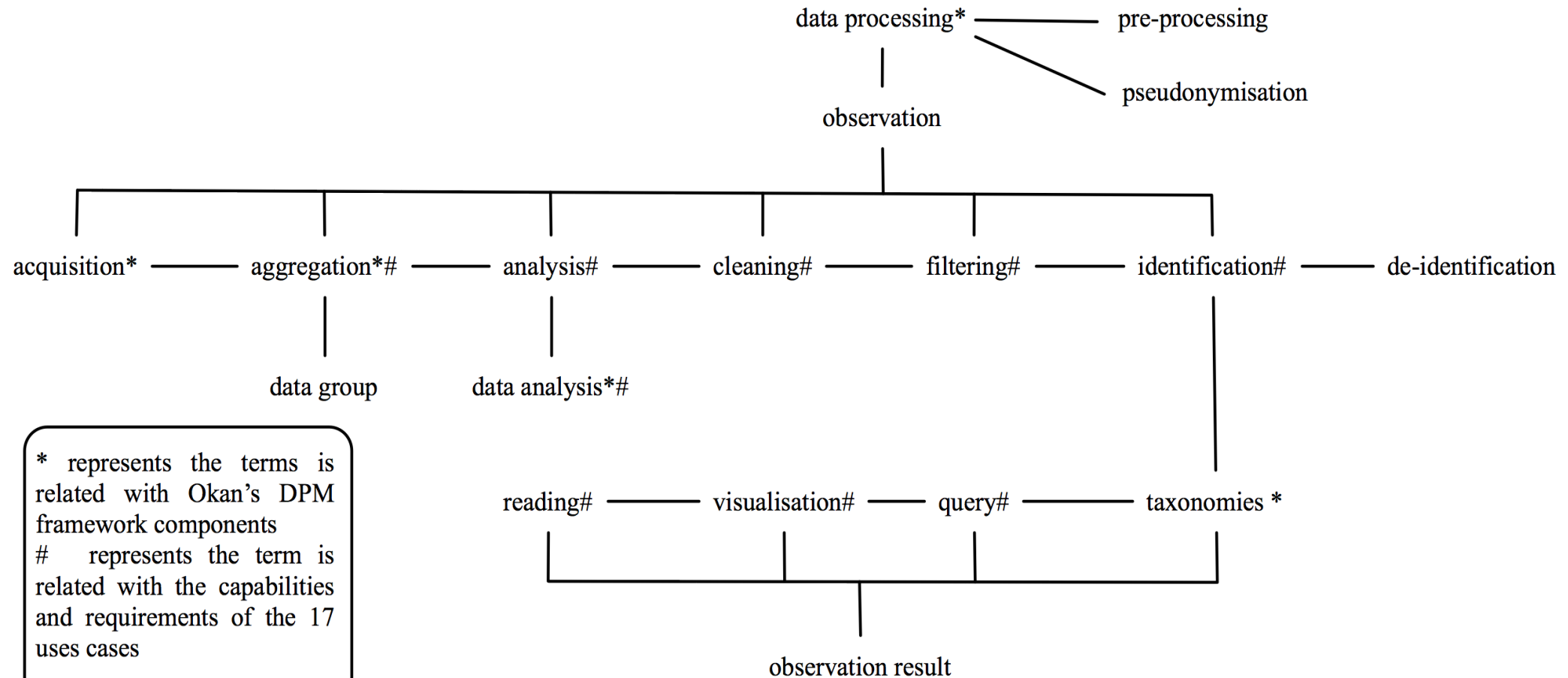


# Concepts of the class “data” and related concepts

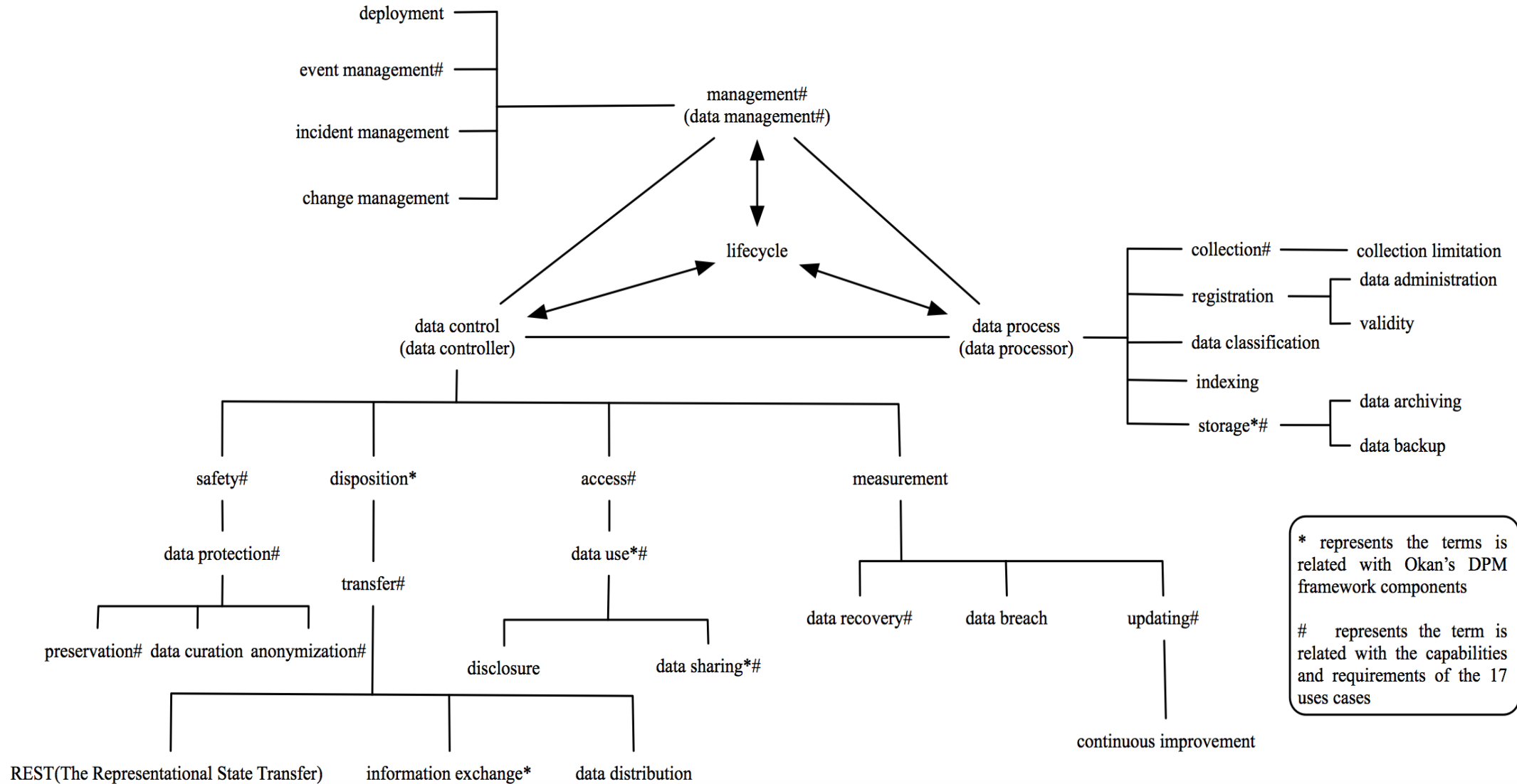


\* represents the term is related with Okan's DPM framework components  
 # represents the term is related with the capabilities and requirements of 17 use cases

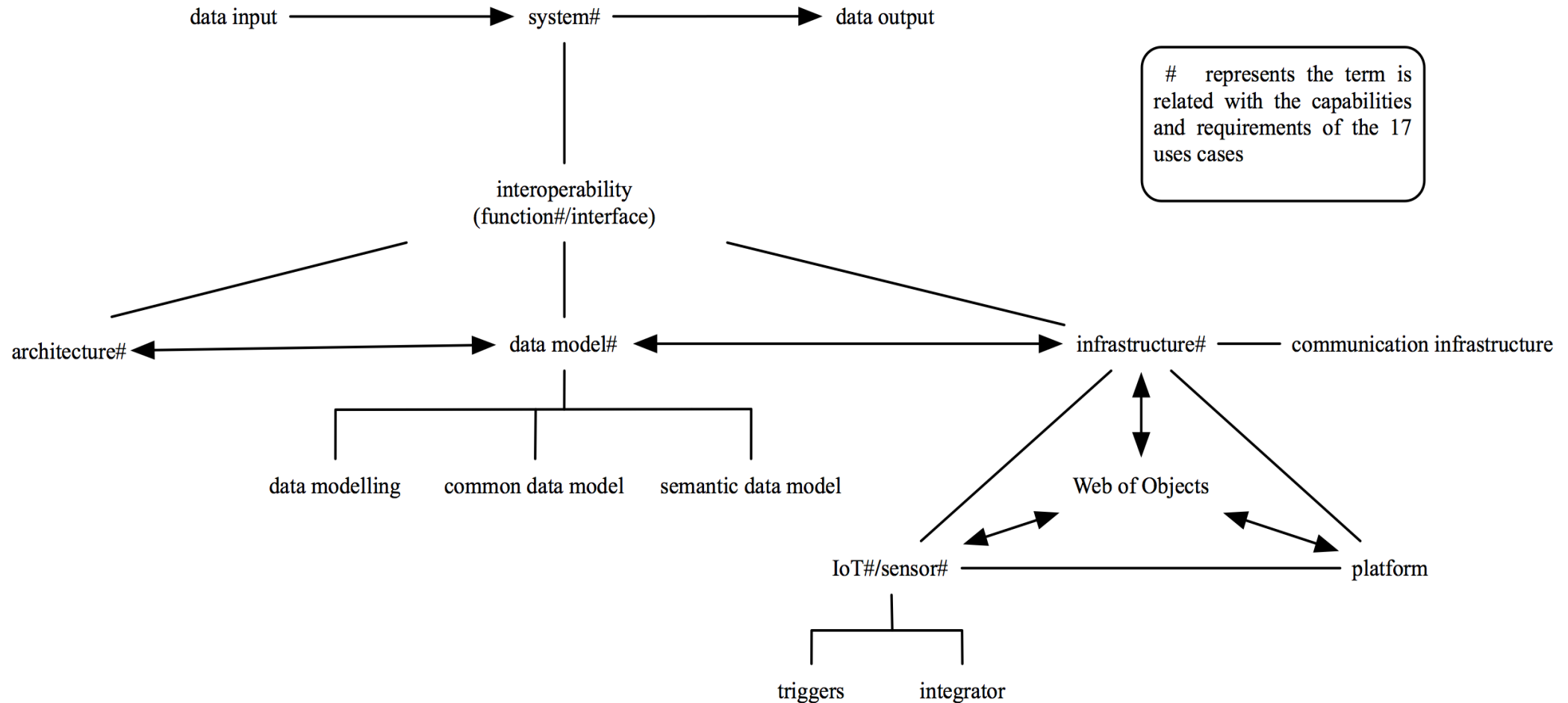
# Concepts of the class “processing” and related concepts



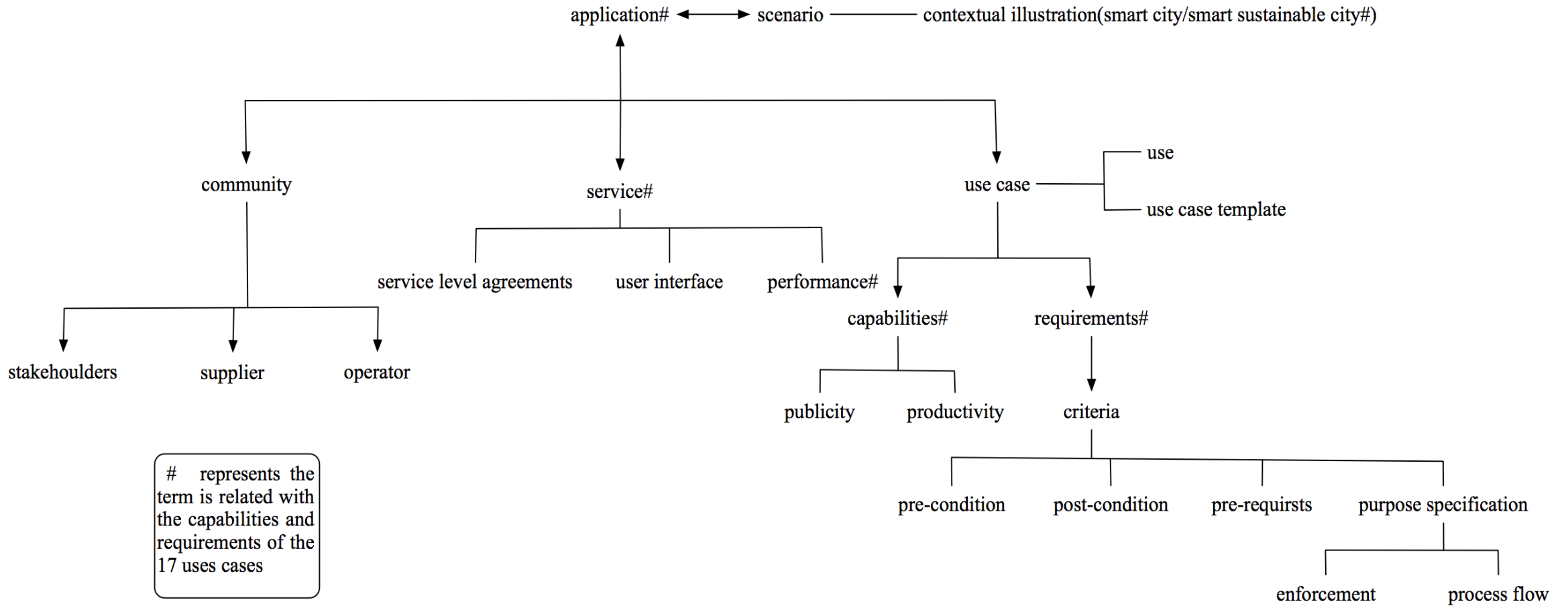
# Concepts of the class “management” and related concepts



# Concepts of the class “system” and related concepts



# Concepts of the class “application” and related concepts



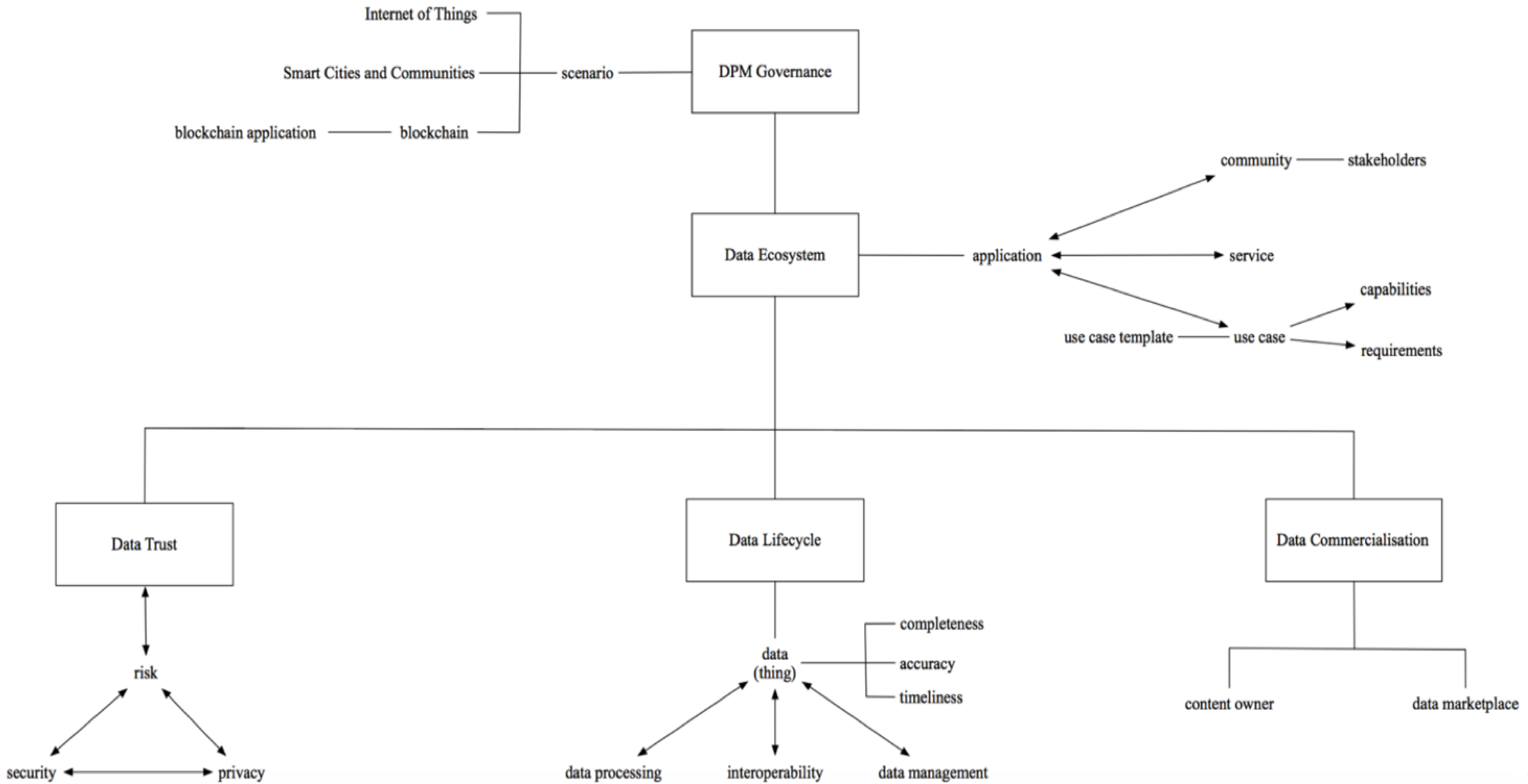


## FG-DPM-O-140R1 (Origins of 30 terms)

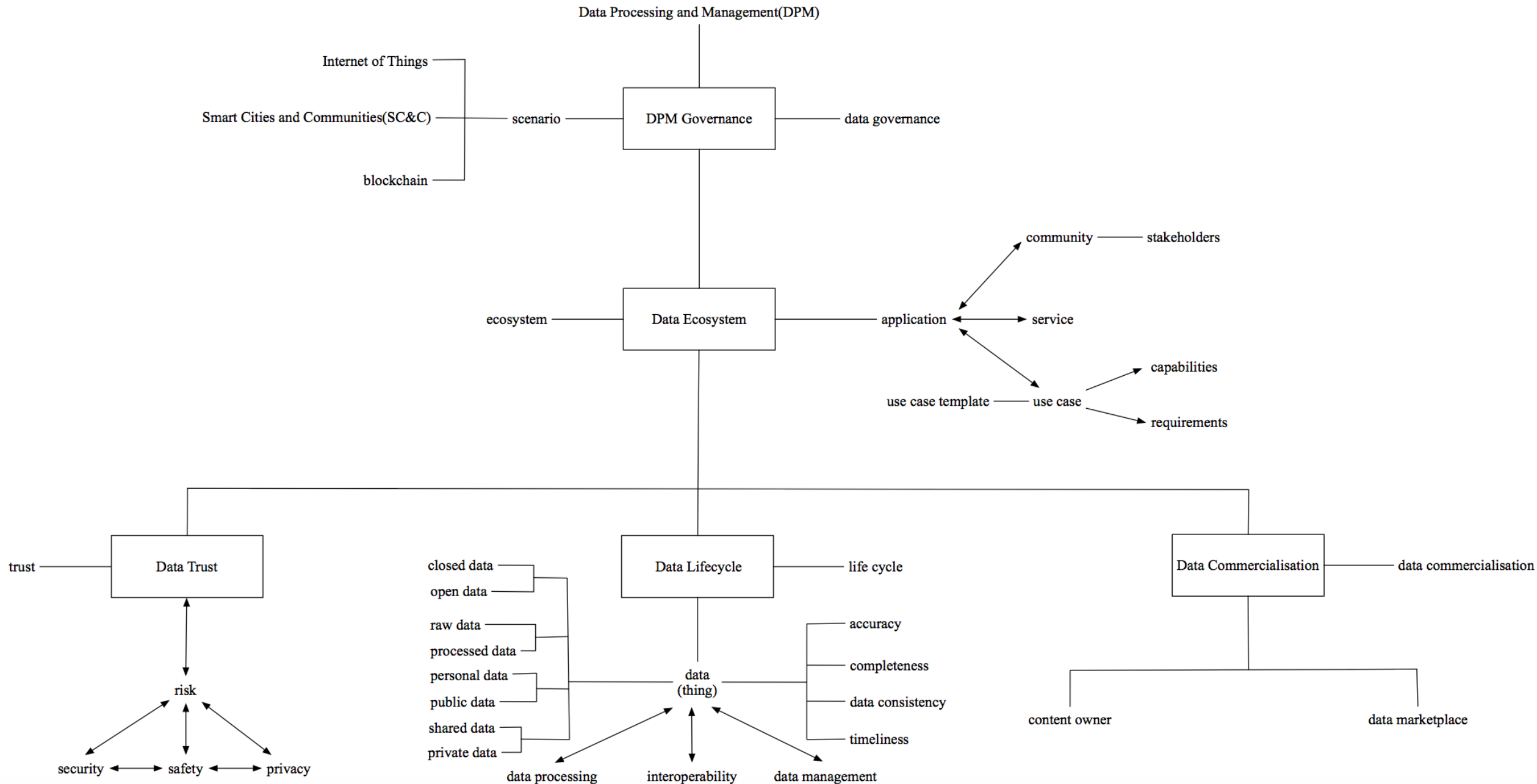
- The number of the terms is changed from 194(FG-DPM-I-250) to 30
- The 194 terms are mapped with 19 input documents from all WGs.
- The criteria for term identification:
  - 1) terms appeared in the key words and are marked with “V”;
  - 2) terms appeared in the definition clause and are marked with “X”;
  - 3) terms appeared in both key words and definition clause are marked with “\*”;
  - 4) terms appeared in the key words clause but not in the definition clause, however are important in terms of their frequently used in titles or subtitles of input documents are remarked with “#”
  - 5) terms appeared in the definition clause but not in the key word clause, however are important in terms of they are core concepts in titles or subtitles are marked with “\*\*”.
- As result, 31 terms are left. However, the the term “blockchain application” is too specific then the term is deleted. Eventually, the 30 terms are identified as the core terms and concepts for DPM for support IoT and SC&C.



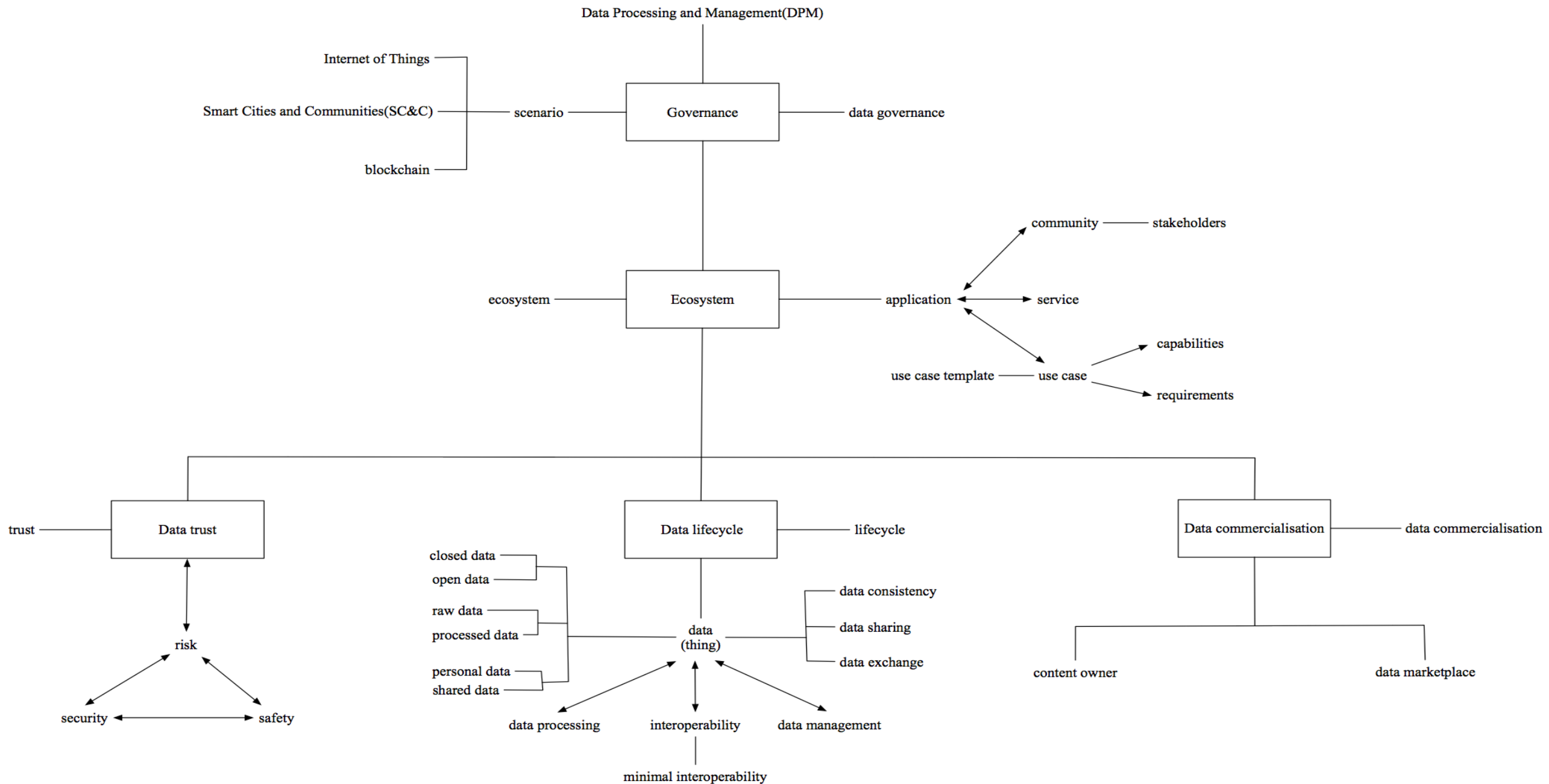
# The DPM core concepts and the relationships of the concepts: **from five dimensions** (D0.2, 30 terms, DPM-O-144)



# The DPM core concepts and the relationships of the concepts: **from five dimensions** (D0.2, **41 terms**, DPM-I-283)



# Basic concepts of DPM in FG-DPM and their relationships under multi-dimensions (DPM-O-172, 38 terms)



**Uses of DPM concepts  
(DPM-I-282/DPM-O-172, DPM-I-283)**

# Uses of DPM concepts and taxonomies (DPM-0-172) (38 terms)

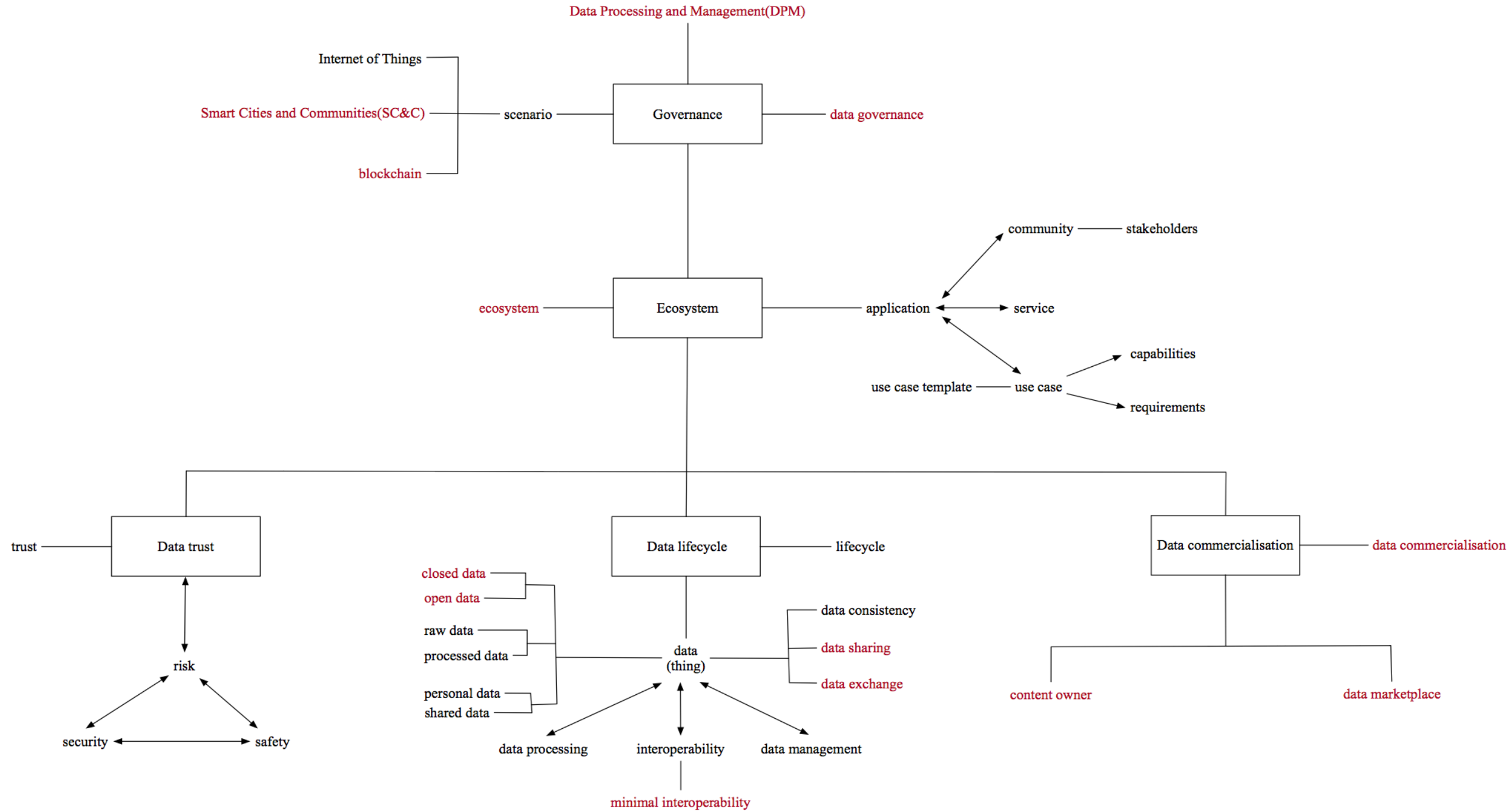
- Contributions to all WGS and the deliverables
- Potential uses
  - IEC/ISO/ITU-T Smart Cities Coordination Task Group Draft White Paper: Suggested Priority Terms in Need of Common Definitions to Support Standards Activities for Smart Cities
  - Extension of white paper, specific to DPM, as foundation for next white paper

# Categorization of DPM core concepts in Five dimensions(D0.2)

Concept number	DPM dimension	Basic DPM concept	DPM concept reference in [b-FG-DPM TS D0.1]
1	Governance	blockchain	3.1.2
2		data governance	3.2.5
3		data processing and management (DPM)	3.2.7
4		Internet of things	3.1.9
5		scenario	3.1.18
6		Smart Cities and Communities (SC&C)	3.2.11
7	Ecosystem	application	3.1.1
8		capabilities	3.1.3
9		community	3.1.4
10		ecosystem	3.2.9
11		requirements	3.1.15
12		service	3.1.20
13		stakeholders	3.1.22
14		use case	3.1.25
15	use case template	3.1.26	
16	Data trust	risk	3.1.16
17		safety	3.1.17
18		security	3.1.19
19		trust	3.1.24
20	Data lifecycle	closed data	3.2.1
21		data	3.1.5
22		data consistency	3.1.6
23		data management	3.1.7
24		data processing	3.1.8
25		data exchange	3.2.4
26		data sharing	3.2.8
27		interoperability	3.1.10
28		lifecycle	3.1.11
29		minimal interoperability	3.2.10
30		open data	3.2.11
31		personal data	3.1.12
32		processed data	3.1.13
33		raw data	3.1.14
34		shared data	3.1.21
35		thing	3.1.23
36	Data commercialisation	content owner	3.2.2
37		data commercialization	3.2.3
38		data marketplace	3.2.6



# New definitions given by FG-DPM meetings (DPM-O-172, 38 terms)



# Contribution to WGs and the deliverables

Deliverables (in 8 <sup>th</sup> FG-DPM meeting )	Statistics for term usage(unit: term)
D0.2	2 terms/38
D1.1	11 terms/38
D2.1	30 terms/38
D3.2(output in 7 <sup>th</sup> FG-DPM meeting)	2 term/38
D3.3(output in 7 <sup>th</sup> FG-DPM meeting)	3 terms/38
D3.5(output in 7 <sup>th</sup> FG-DPM meeting)	7 terms/38
D3.6	10 terms/38
D3.7(output in 7 <sup>th</sup> FG-DPM meeting)	9 terms/38
D3.8	12 terms/38
D4.1	7 terms/ 38
D4.3	3 terms/38
D4.4	1 terms/38
D5.1(D5.2-D5.4)	3 terms/38

# (For information) the usage of the terms in all WG deliverables

No	Term	Definition in clause of D0.1	Document	D0.2	D1.1	D2.1	D3.2	D3.3	D3.5	D3.6	D3.7	D3.8	D4.1	D4.3	D4.4	D5.1
1	application	3.1.1				✓			✓	✓	✓	✓				
2	capabilities	3.1.2			✓	✓					✓					
3	community	3.1.3			✓	✓										
4	data	3.1.4			✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓
5	data consistency	3.1.5				✓							✓			
6	data management	3.1.6				✓				✓		✓				
7	data processing	3.1.7			✓	✓							✓			
8	Internet of Things	3.1.8			✓	✓	✓		✓	✓	✓	✓	✓	✓		
9	interoperability	3.1.9			✓	✓		✓				✓				
10	life cycle	3.1.10			✓	✓							✓			
11	personal data	3.1.11				✓							✓			
12	privacy	3.1.12			✓	✓							✓			
13	private data	3.1.13				✓										
14	processed data	3.1.14				✓										
15	raw data	3.1.15				✓										
16	requirements	3.1.16			✓	✓		✓		✓	✓	✓		✓	✓	
17	risk	3.1.17				✓							✓			
18	safety	3.1.18				✓										
19	scenario	3.1.19			✓							✓				
20	security	3.1.20			✓	✓					✓		✓			
21	service	3.1.21			✓	✓			✓	✓	✓	✓				
22	shared data	3.1.22				✓										
23	Smart Cities and Communities (SC&C)	3.1.23		✓		✓				✓		✓	✓			
24	stakeholders	3.1.24			✓	✓							✓			✓
25	thing	3.1.25					✓		✓			✓				
26	trust	3.1.26			✓	✓				✓				✓		
27	use case	3.1.27		✓	✓											
28	use case template	3.1.28		✓	✓											
29	accuracy	3.2.1												✓		
30	blockchain	3.2.2				✓			✓	✓	✓	✓				
31	closed data	3.2.3				✓										
32	completeness	3.2.4												✓		
33	content owner	3.2.5														✓
34	data commercialization	3.2.6			✓	✓										✓
35	data governance	3.2.7			✓	✓							✓			
36	data marketplace	3.2.8				✓										✓
37	Data Processing and Management (DPM)	3.2.9			✓	✓						✓	✓			
38	ecosystem	3.2.10			✓	✓							✓	✓		✓
39	open data	3.2.11				✓										
40	public data	3.2.12				✓										
41	timeliness	3.2.13												✓		

**✓** Represents that the term is used in the title or subtitle in the document  
**✓** Represents that the term is used in the terms and definition clause in the

Thanks for your attention!

anxiaomi@ruc.edu.cn



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