
Business Models for Data Assets - The Linked Data Business Cube Revisited

Tassilo Pellegrini (UAS St. Pölten) & Christian Dirschl (Wolters Kluwer)

Workshop: Governing Value - The Practice of Exploiting Data Value
@ Semantics 2018 Conference

Tuesday, September 11, 2018 - 09:00 to 17:30
University of Technology, Vienna

Organizing Committee: Judie Attard, Rob Brennan, Markus Helfurt, Pieter De Leenheer

Webpage: <http://2018.datavalue.adaptcentre.ie/>

Service Science

- Term framed by IBM Research (2004): „**Service Science, Management, Engineering and Design (SSME+D)**“. Research since early 1990s (de Grandbois 2013).
- **Basic premises** (Vargo & Lusch 2004):
 - From a Goods-dominant Logic to a Service-Dominant Logic.
 - From Value in Use to Value in Context
 - Co-Creation of value
 - Value is uniquely determined by the beneficiary
 - From operand to operant resource integration
- According to Ostrom et al. (2015, p. 127) the relevance of **Service Science** is derived from ...
 - Increasing share of services in the global economy
 - Increasing mediation of services through technology & platforms
 - Changes in organisational and institutional conditions of value creation, especially through modes of co-production & co-creation
 - The increasing complexity of control and governance of value creation and innovation processes

Central Concepts

➤ **Business Model =**

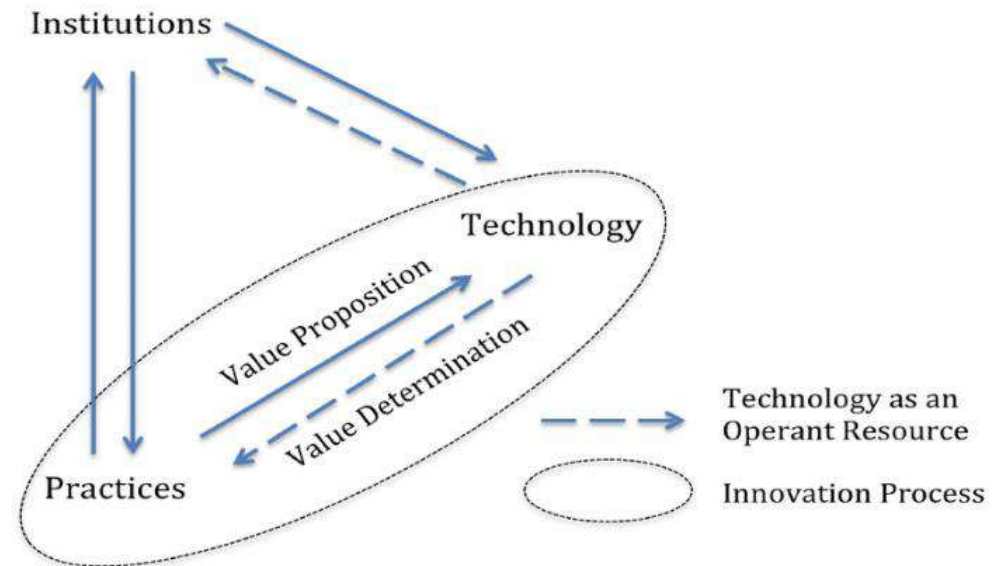
- a "heuristic logic that connects technical potential with the realization of economic value" [19].

- a system-level approach to explaining how firms commercialize their products and services, utilize productive factors – such as technology – to diversify their business practices, propose value and realize it through innovation.

➤ **Value Propositions =**

- "the promised set of benefits the firm offers to its consumers" [34].

- value propositions mobilise assets and link them together to leverage value-creating processes that unfold through co-creation between resource-integrating actors.



4 categories of resources in service systems:

(1) resources with rights, (2) resources as property, (3) physical entities, and (4) socially constructed resources. (Maglio et al. 2009)

Digitization & Asset Diversification

Pre-Digital Diversification
prior to 1980 / Service-
Reference **implicit &**
unidirectional

- Content
- Hardware

Digital Diversification
after 1980 / Service-
Reference **implicit &**
unidirectional

- Content
- Software
- Hardware

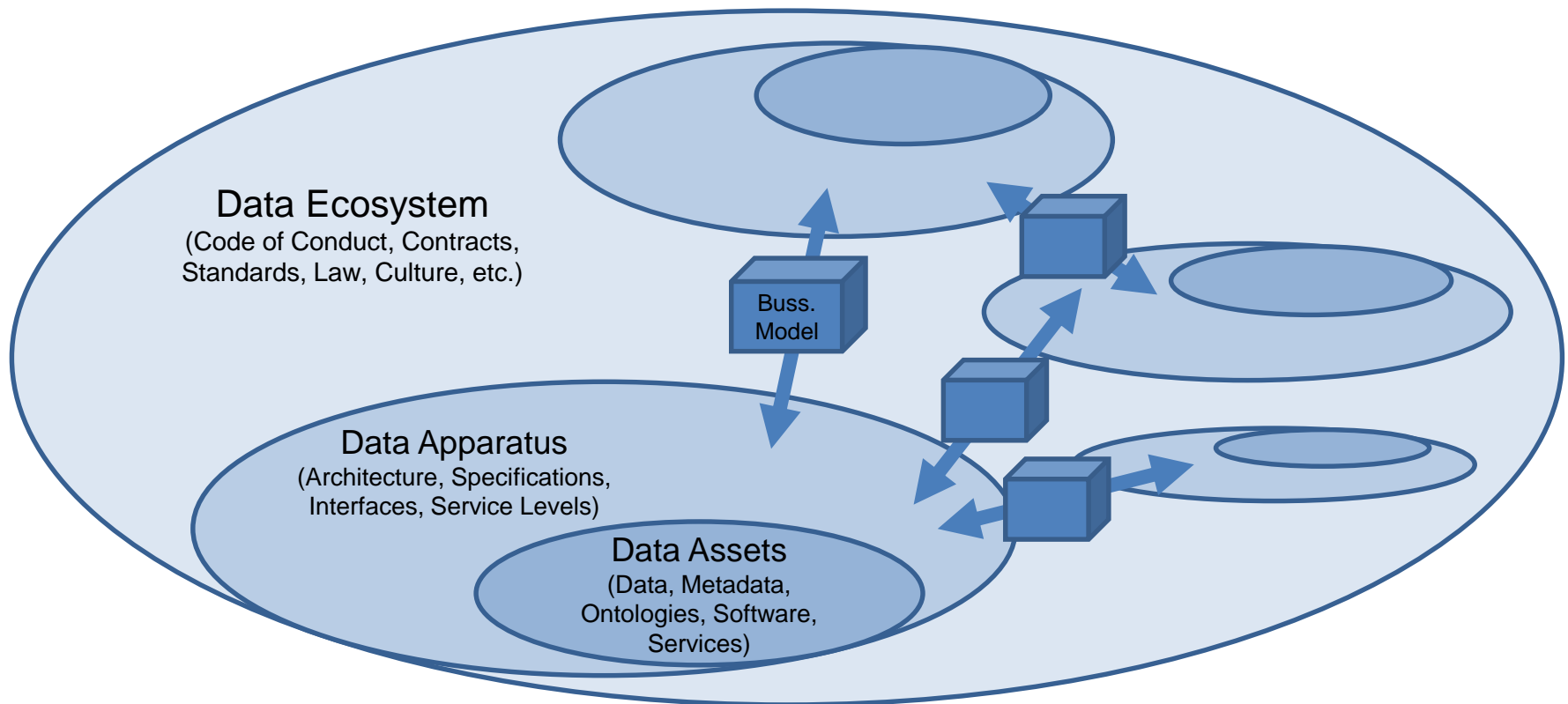
Digital Diversification
from 2000 / Service-
Reference **explicit &**
bidirectional

- Content
- Services
- Software
- Hardware

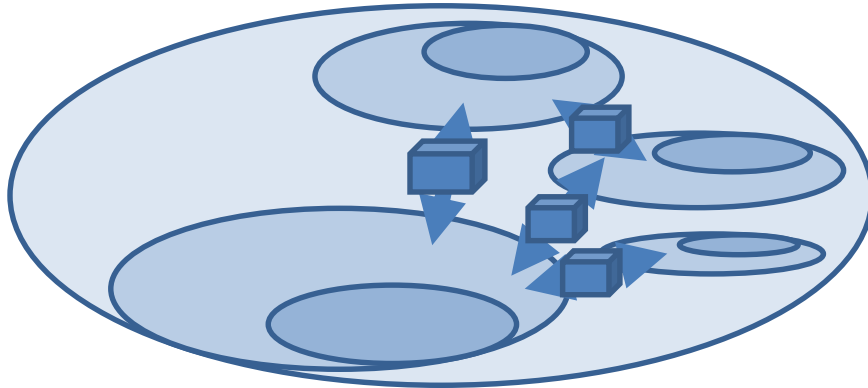
Digital Diversification since 2010 /
Service-Reference **explicit &**
multidirectional

- Data
- Metadata
- Ontologies
- Content
- Services
- Software
- Hardware

Data Ecosystems



Data Ecosystems



Data Assets =

- instance data, metadata, ontology, content, service and software.
- Assets are being created by applying intellectual property law to valuable artefacts.

Data Apparatus =

- “the technical equipment or machinery needed for a particular activity or purpose” [33].
- refers to the system-level design and functional combination of data assets in the production and processing of data. The apparatus determines the assets’ specificities and the value propositions that can be assigned to them [28] in the course of service delivery.

Data Ecosystem =

- “relatively self-contained, self-adjusting systems of resource integrating actors connected by shared institutional logics and mutual value creation through service exchange” [24].
- evolve from the functional coupling of two or more data apparatuses with the purpose to derive value from data assets by applying business models.

Data Assets – Institutional Perspective

Data Assets



Legal Frameworks



	Copyright	Database Right	Competition Law	Patent Rights
Instance-Data	Case by Case	Yes	Yes	Case by Case
Metadata	Case by Case	Yes	Yes	Case by Case
Ontologies	Yes	Yes	Yes	Case by Case
Content	Yes	No	Yes	No
Services	Yes	No	Yes	Yes
Software	Yes	No	Yes	Yes

Data Policy

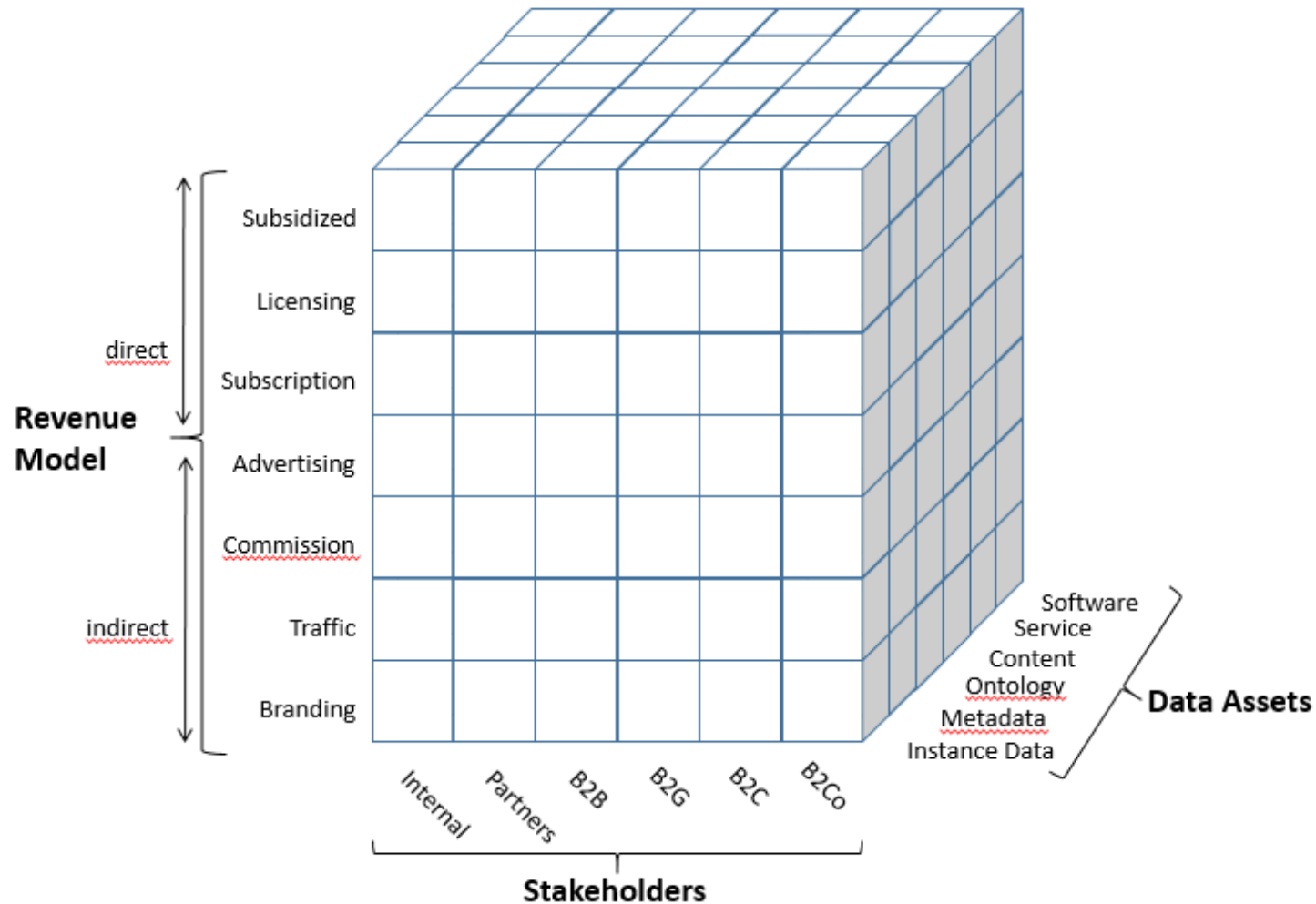


No rights reserved

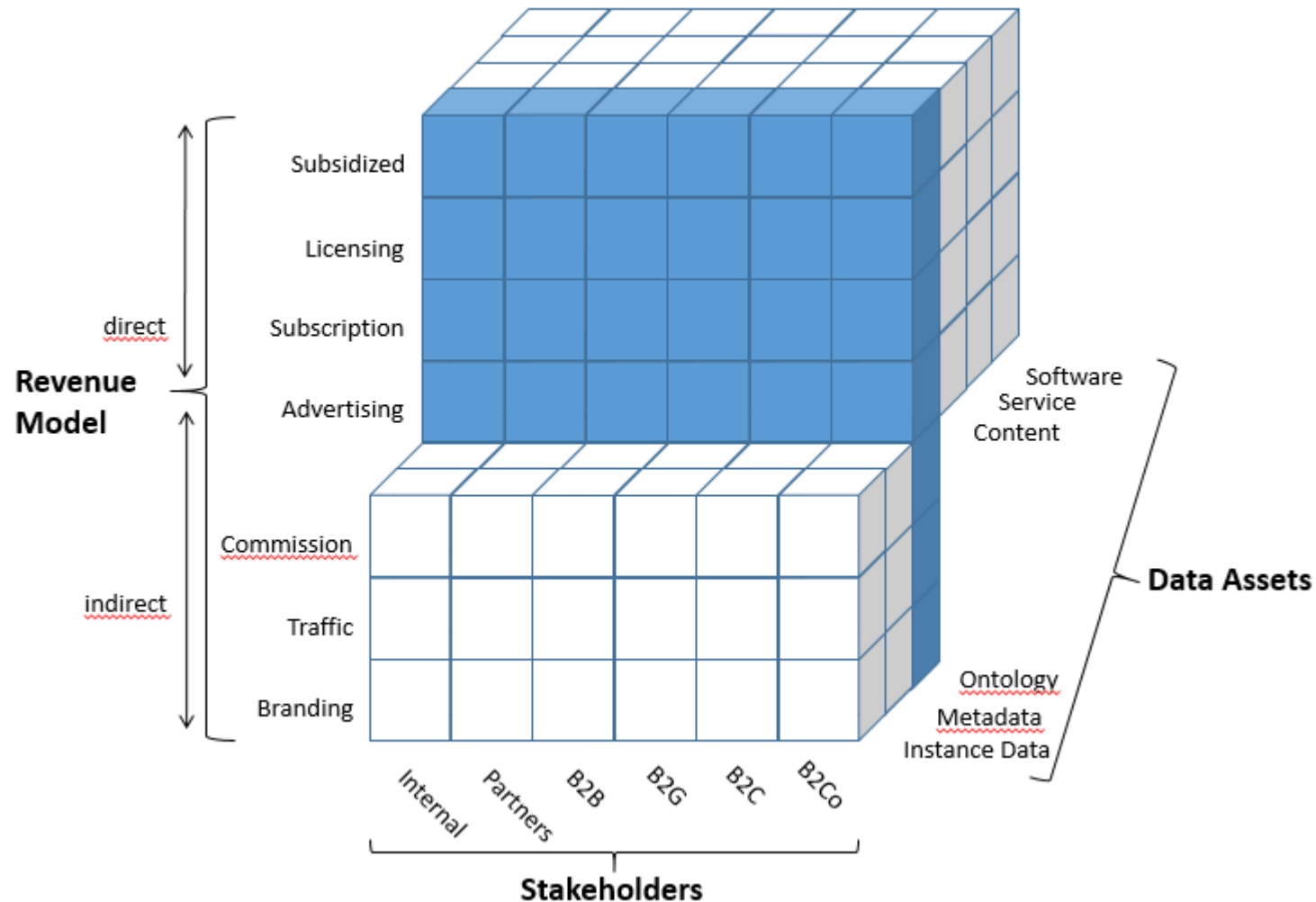
----- Some rights reserved -----

All rights reserved

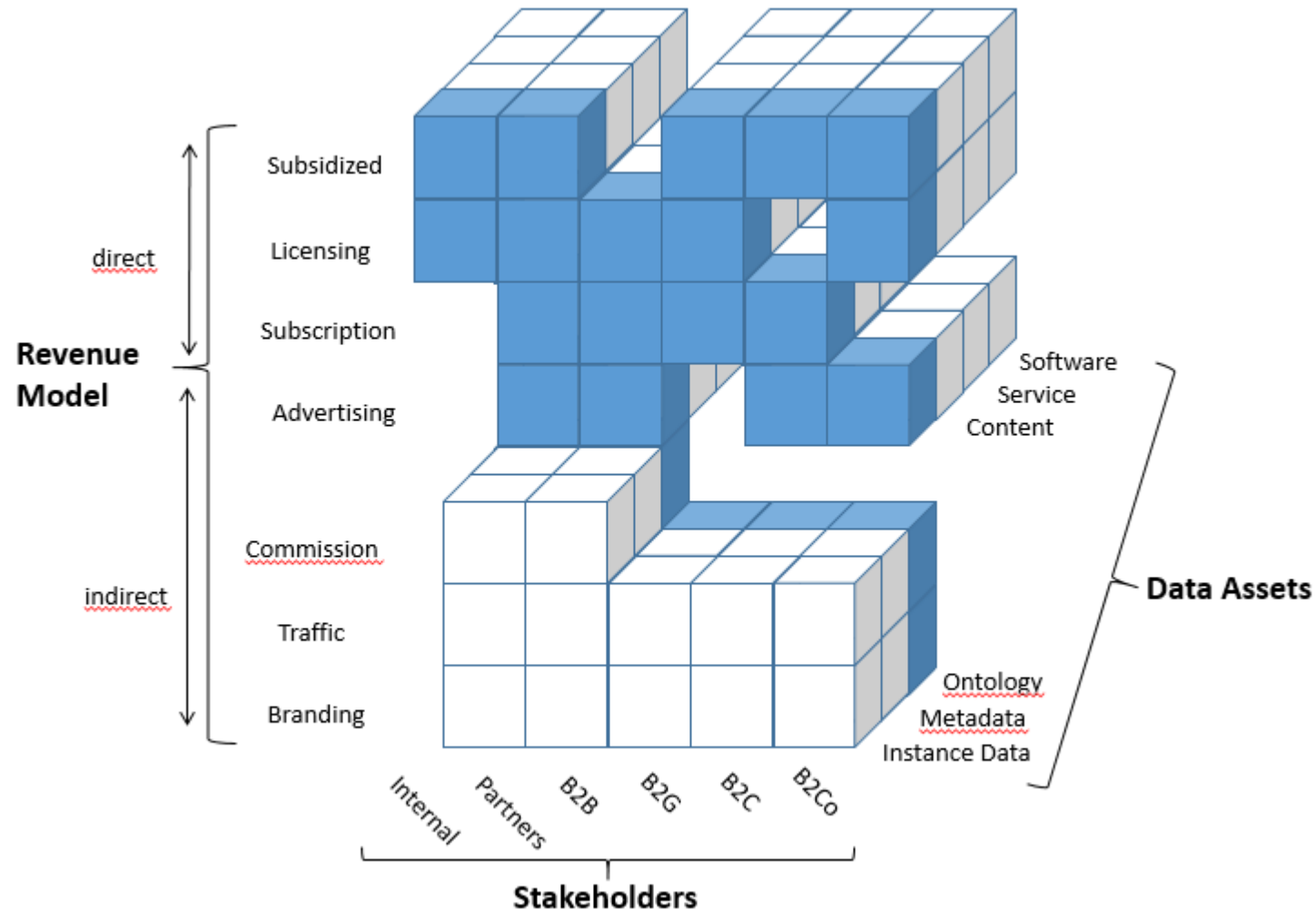
Data Business Cube



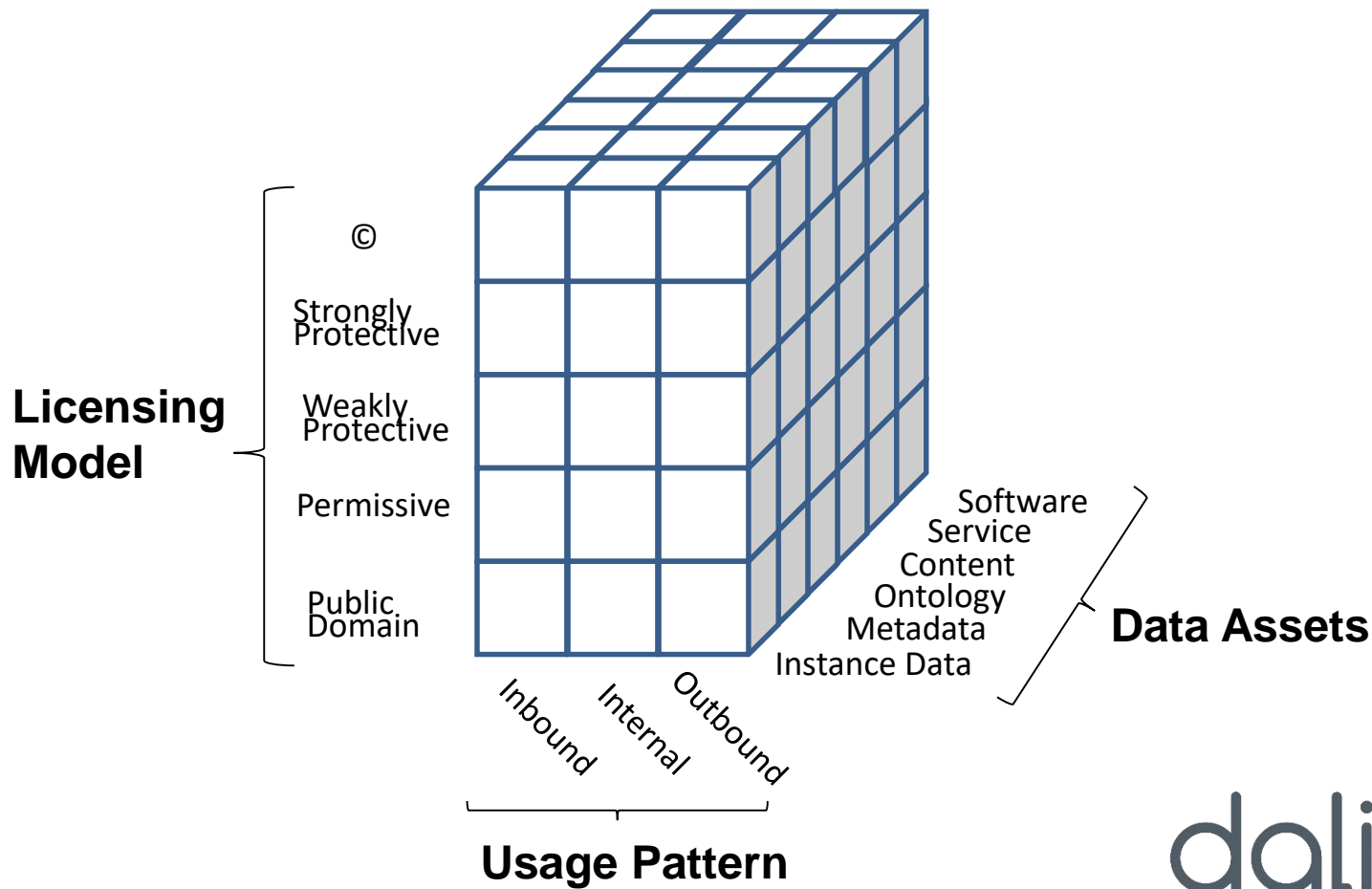
Revenue Models & Data Assets



Revenue Models & Data Assets & Stakeholders



Data Business Cube – The Licensing Perspective



Discussion

- The Linked Data Business Cube is a heuristic method to model and investigate business models for data assets.
- Data assets can have various asset specificities, depending on the licensing terms under which they are being provided.
- Asset specificities determine to a high degree the applicable revenue models and stakeholders involved in the value creation process.
- Having a good understanding of the interactions between assets specificities, revenue models and stakeholders is crucial in assigning value propositions for data assets and designing the data apparatus to commercialize them within data ecosystems.

1. Archer, Phil; Dekkers, Max; Goedertier, Stijn; Loutas, Nikolaos (2013). Study on business models for Linked Open Government Data (BM4LOGD - SC6DI06692). Prepared for the ISA programme by PwC EU Services See also: http://ec.europa.eu/isa/documents/study-on-business-models-open-government_en.pdf, accessed May 10, 2014
2. Berners-Lee, Tim (1998). Web Architecture from 50,000 feet. In: <http://www.w3.org/DesignIssues/Architecture.html>, accessed May 20, 2014
3. Brinkner, Scott (2010). Business models for linked data and web 3.0. In: chiefmartec.com, 10.03.2010. See also: <http://chiefmartec.com/2010/03/business-models-for-linked-data-and-web-30/>, accessed April 10, 2014
4. Cobden, Marcus; Black, Jennifer; Gibbins, Nicholas; Carr, Les; Shadbolt, Nigel (2011). A Research Agenda for Linked Closed Data. In: Second International Workshop on Consuming Linked Data, Bonn: Ceur Workshop Proceedings. See also: http://ceur-ws.org/Vol-782/CobdenEtAl_COLD2011.pdf, accessed April 10, 2014
5. Committee on Commerce, Science and Transportation (2013). A Review of the Data Broker Industry: Collection, Use and Sale of Consumer Data for Marketing Purposes. Staff Report for Chairman Rockefeller, December 18, 2013. See also: https://law.ku.edu/sites/law.ku.edu/files/docs/media_law/2014/Data_Broker_Industry_Senate_Report.PDF, accessed May 5, 2014
6. Cranford, Steve (2009). Spinning a Data Web. In: Price Waterhouse Coopers (Ed.). Technology Forecast, Spring 2009. See also: <http://www.pwc.com/us/en/technology-forecast/spring2009/index.jhtml>, accessed September 20, 2012
7. Ghosh, Rishab Ayer et al. (2006). Economic impact of open source software on innovation and the competitiveness of the Information and Communication Technologies (ICT) sector in the EU. Final report prepared on November 20, 2006 (Contract ENTR/04/112.). See also http://ec.europa.eu/enterprise/sectors/ict/files/2006-11-20-flossimpact_en.pdf, accessed May 10, 2014
8. Halford, Susan; Pope, Catherine; Weal, Mark (2012). Digital Futures? Sociological Challenges and Opportunities in the Emergent Semantic Web. In: *Sociology*, 47/1
9. Kinnari, Tomi (2013). Open data business models for media industry. A Finnish case study. Master Thesis, Department of Information and Service Economy, Aalto University. See also: http://epub.lib.aalto.fi/ethesis/pdf/13166/hse_ethesis_13166.pdf, accessed March 29, 2014
10. Latif, Anif; Us Saeed, Anwar; Höfler, Patrick; Stocker, Alexander; Wagner, Claudia (2009). The Linked Data Value Chain: A Lightweight Model for Business Engineers. In: Proceedings of I-Semantics 2009, the 5th International Conference on Semantic Systems. Graz: Journal of Universal Computer Science, p. 568–577
11. McHugh, Linda (2009). Measuring the Value of Metadata. White Paper: Baseline Consulting
12. Mitchell, Ian; Wilson, Mark (2012). Linked Data. Connecting and exploiting big data. Fujitsu White Paper, March 2012. <http://www.fujitsu.com/uk/Images/Linked-data-connecting-and-exploiting-big-data-%28v1.0%29.pdf>, accessed September 12, 2012
13. Pellegriani, Tassilo; Ermilov, Ivan (2013). Guide and Best Practices to Licensing Interlinked Data. Public Deliverable 7.4. EU-Project LOD 2. Grant Agreement No: 257943. See also <http://svn.aksw.org/lod2/WP7/D7.4/public.pdf>, accessed 03.01.2014
14. Pellegriani, Tassilo (2014). Linked Data Licensing – Datenlizenzierung unter netzökonomischen Bedingungen. In: Schweighofer, Erich; Kummer, Franz; Hötendorfer, Walter (Hg.). *Transparenz. Tagungsband des 17. Internationalen Rechtsinformatik Symposium IRIS 2014*. Wien: Verlag der Österreichischen Computerergesellschaft, S. 159–168
15. Rayfield, Jem (2012). Sports Refresh: Dynamic Semantic Publishing. In: http://www.bbc.co.uk/blogs/bbcinternet/2012/04/sports_dynamic_semantic.html, visited April 20, 2012
16. Vafopoulos, Michalis N. (2011). A Framework for Linked Data Business Models. 15th Panhellenic Conference on Informatics (PCI) 2011. Available at SSRN: <http://ssrn.com/abstract=1850365>, accessed April 10, 2014
17. Wood, David (Ed.) (2010). *Linking Enterprise Data*. New York: Springer
18. Wood, David (Ed.) (2011). *Linking Government Data*. New York: Springer
19. Chesbrough, H., 2002. The role of the business model in capturing value from innovation: evidence from Xerox Corporation's technology spin-off companies. *Industrial and Corporate Change* 11, 529–555. <https://doi.org/10.1093/icc/11.3.529>
20. Zott, C., Amit, R., Massa, L., 2011. The Business Model: Recent Developments and Future Research. *Journal of Management* 37, 1019–1042. <https://doi.org/10.1177/0149206311406265>
21. Pellegriani, T., Dirschl, C., Eck, K., 2014. Linked data business cube: a systematic approach to semantic web business models. *ACM Press*, pp. 132–141. <https://doi.org/10.1145/2676467.2676489>
22. W3C, 2018. *Semantic Web Case Studies and Use Cases* [WWW Document], n.d. URL <https://www.w3.org/2001/sw/sweo/public/UseCases/> (accessed 7.4.18).
23. de Grandbois, Y., 2013. The business of Service Science. *Business Information Review* 30, 204–209. <https://doi.org/10.1177/0266382113518837>
24. Vargo, S.L., Lusch, R.F., 2014. Inversions of service-dominant logic. *Marketing Theory* 14, 239–248. <https://doi.org/10.1177/1470593114534339>
25. Borgman, C.L., 2015. Big data, little data, no data: scholarship in the networked world. The MIT Press, Cambridge, Massachusetts.
26. Oxford Dictionaries, 2018. data | Definition of data in English by Oxford Dictionaries [WWW Document], n.d. URL <https://en.oxforddictionaries.com/definition/data> (accessed 7.5.18).
27. Lavoie, B. 2000. The OAI reference model [WWW Document], 2015. URL <https://www.oclc.org/research/publications/library/2000/lavoie-oai.html> (accessed 7.5.18).
28. Riordan, M.H., Williamson, O.E., 1985. Asset specificity and economic organization. *International Journal of Industrial Organization* 3, 365–378. [https://doi.org/10.1016/0167-7187\(85\)90030-X](https://doi.org/10.1016/0167-7187(85)90030-X)
29. Hess, C., Ostrom, E. (Eds.), 2007. *Understanding knowledge as a commons: from theory to practice*. MIT Press, Cambridge, Mass.
30. van Schalkwyk, F., Willmers, M., McNaughton, M., 2016. Viscous Open Data: The Roles of Intermediaries in an Open Data Ecosystem. *Information Technology for Development* 22, 68–83. <https://doi.org/10.1080/02681102.2015.1081868>
31. Demchenko, Y., de Laat, C., Membrey, P., 2014. Defining architecture components of the Big Data Ecosystem, in: 2014 International Conference on Collaboration Technologies and Systems (CTS). Presented at the 2014 International Conference on Collaboration Technologies and Systems (CTS), IEEE, Minneapolis, MN, USA, pp. 104–112. <https://doi.org/10.1109/CTS.2014.6867550>
32. Ann, C., 2013. Personal Data Ecosystem (PDE) & Privacy by Design Approach to an Individual's Pursuit of Radical Control. *Stand Alone* 89–101. <https://doi.org/10.3233/978-1-61499-295-0-89>
33. apparatus | Definition of apparatus in English by Oxford Dictionaries [WWW Document], 2018. Oxford Dictionaries | English. URL <https://en.oxforddictionaries.com/definition/apparatus> (accessed 8.28.18).
34. Biloshapka, V., Osiyevskyy, O., 2018. Value creation mechanisms of business models: Proposition, targeting, appropriation, and delivery. *The International Journal of Entrepreneurship and Innovation* 19, 166–176. <https://doi.org/10.1177/1465750318782774>
35. Frow, P., McColl-Kennedy, J.R., Hilton, T., Davidson, A., Payne, A., Brozovic, D., 2014. Value propositions: A service ecosystems perspective. *Marketing Theory* 14, 327–351. <https://doi.org/10.1177/1470593114534346>
36. Vargo, S.L., Akaka, M.A., Vaughan, C.M., 2017. Conceptualizing Value: A Service-ecosystem View. *Journal of Creating Value* 3, 117–124. <https://doi.org/10.1177/2394964317732861>