An Update for Taxonomy Designers – Methodological Guidance from Information Systems Research

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Appendix (available online via http://link.springer.com)

Appendix 1: Related taxonomy design guidance

Process of the taxonomy development method

Figure A1 visualises the original method for taxonomy development.

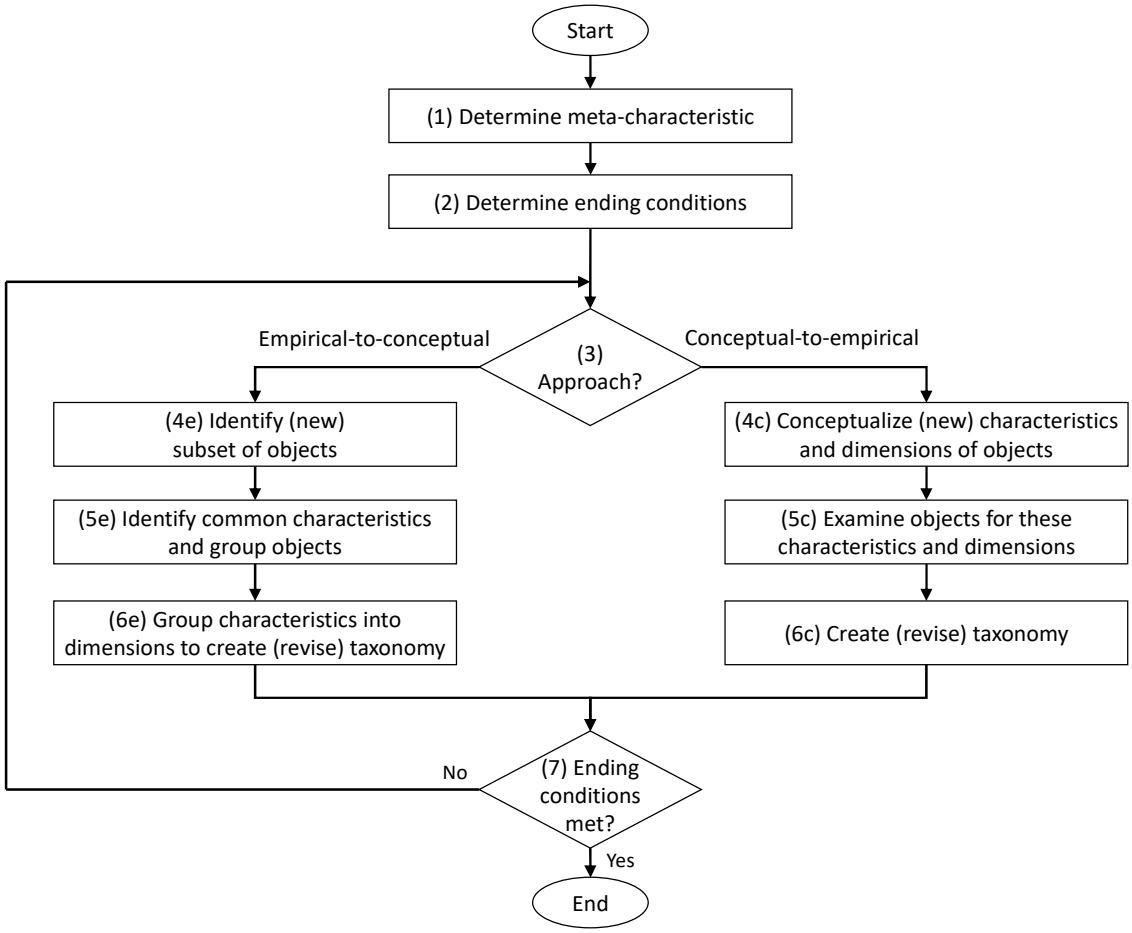

Figure A1: Taxonomy development method by Nickerson et al. (2013, p. 345)

Overview of related taxonomy design guidance

Table A1 provides an overview of related guidance on taxonomy building and evaluation in IS research and other disciplines. We particularly focused on state-of-the-art research because Nickerson et al. (2013) have already covered and built upon the literature before 2013. We screened taxonomy design guidance in the AIS Electronic Library (AISeL) to obtain IS-specific work and in Google Scholar to take into account additional disciplines (search performed on 23.12.2020). We extracted insights on *guidance for taxonomy design* (i.e., for building and evaluation) as well as derived *lessons learned* in the form of additional aspects, needs, and requirements that should be fulfilled by a method for taxonomy design. The column *consideration by the ETDP and the TDR* indicates how these aspects and needs are addressed by our extended design method and the corresponding recommendations (i.e., validating cross check with other guidance).

Table A1: Overview of related taxonomy guidance

Reference	Discipline	Citations	Artefact	Guidance for taxonomy design	Derived lessons learned	Consideration by the ETDP and the TDR
Nickerson, R. C., Varshney, U., & Muntermann, J. (2013). A method for taxonomy development and its application in information systems. *European Journal of Information Systems*, *22*(3), 336–359.	Information systems	545	Method and ending conditions	*Taxonomy building* See also Appendix 1. *Taxonomy evaluation* Objective and subjective ending conditions.		Adapted as a basis for our extended design process (ETDP) and the design recommendations (TDR)
Land, L., Smith, S., & Pang, V. (2013). Building a taxonomy for cybercrimes. In *Proceedings of the 17th Pacific Asia Conference on Information Systems (PACIS 2013),* Jeju Island, South Korea.	Information systems (cyber-crime)	13	Extended method based on Nickerson et al. (2013)	*Taxonomy building* Nickerson et al. 2013. *Taxonomy evaluation* Iterative testing phase: Apply a working taxonomy and build a case studies library to test whether all case studies fit the taxonomy.	• Need for taxonomy evaluation	*Evaluation*: • ETDP Steps 13-17 • TDR 6, 20-23

Reference	Discipline	Citations	Artefact	Guidance for taxonomy design	Derived lessons learned	Consideration by the ETDP and the TDR
Bayona-Oré, S., Calvo-Manzano, J. A., Cuevas, G., & San-Feliu, T. (2014). Critical success factors taxonomy for software process deployment. *Software Quality Journal*, *22*(1), 21–48.	Computer science (software engineering)	50	Method (five phases, 24 activities)	*Taxonomy building* Planning (area of study, objectives, user needs, scope etc.), identification and extraction of information (sources, terms), design and construction (level of taxonomy, subsequent levels etc.) *Taxonomy evaluation* Testing and validation (test, improvements), deployment (train users, manage taxonomy etc.)	• Need for clearly stated taxonomy objectives • Need for taxonomy evaluation • Need for integrating users in taxonomy design	*Objectives:* • ETDP Steps 1-5 • TDR 1-6 *Evaluation:* • ETDP Steps 13-17 • TDR 6, 20-23 *User integration:* • TDR 23
Mwilu, O. S., Prat, N., & Comyn-Wattiau, I. (2015). Taxonomy development for complex emerging technologies: The case of business intelligence and analytics on the cloud. In *Proceedings of the 19th Pacific Asia Conference on Information Systems (PACIS 2015),* Singapore.	Information systems (complex technologies)	5	Adapted method based on Nickerson et al. (2013) and guidelines for object sources	*Taxonomy building* Guidelines for selecting sources based on systematic literature reviews; common operations during taxonomy design (e.g., delete, split, merge, promote).	• Need for systematically identifying sources • Need for documentation of taxonomy iterations and operations	*Sources:* • ETDP Steps 7e, 7c • TDR 10, 13 *Documentation:* • EDTP Step 18 • TDR 24, 25
Niu, J., Issa, R. R. A., & Mutis, I. (2015). Taxonomy development toward the domain ontology of construction contracts: A case study on AIA a201-2007. In R. R. A. Issa & I. Mutis (Eds.), *Ontology in the aec industry: A decade of research and development in architecture, engineering, and construction* (pp. 217–250). Reston, VA, USA: American Society of Civil Engineers.	Construction management, Information technology	2	Method (7 phases) for taxonomy development in the domain of construction contract	*Taxonomy building* Phases for: define domain and scope, build a conceptual model, review existing classes, determine root classes, identify concepts, associate concepts with classes, re-develop the class hierarchy	• Need for clearly stated taxonomy objectives • Need for considering taxonomy reuse	*Objectives:* • ETDP Steps 1-5 • TDR 1-6 *Reuse:* • TDR 1

Reference	Discipline	Citations	Artefact	Guidance for taxonomy design	Derived lessons learned	Consideration by the ETDP and the TDR
Usman, M., Britto, R., Börstler, J., & Mendes, E. (2017). Taxonomies in software engineering: A systematic mapping study and a revised taxonomy development method. *Information and Software Technology*, *85*, 43–59.	Computer science (software engineering)	53	Revised method (five phases, 13 steps) based on Bayona-Orè et al. (2014)	*Taxonomy building* Planning (knowledge area, objectives, subject matter etc.), identification and extraction (terms, terminology control), design and construction (dimensions, categories of dimensions, relationships) *Taxonomy evaluation* Testing and validation (using and updating taxonomy, validate)	• Need for clearly state taxonomy objectives • Need for taxonomy evaluation • Need for integrating several users in taxonomy design	*Objectives:* • ETDP Steps 1-5 • TDR 1-6 *Evaluation:* • ETDP Steps 13-17 • TDR 6, 20-23 *User integration:* • TDR 23
Correia, A., Paredes, H., & Fonseca, B. (2018). Reframing taxonomy development in collaborative computing research: A review and synthesis of CSCW literature 2003-2010. In *Proceedings of the 17th International Conference on Collaboration Technologies and Social Computing (CRWIG 2018),* Costa de Caparica, Portugal.	Computer science (collaborative computing research)	3	Method (nine steps) based on a systematic literature review	*Taxonomy building* Steps: identification of the need; study selection; indexing; data extraction, analysis; classification; feature analysis; packaging, clustering, analysis; revisiting the sample using Grounded Theory; report	• Need for systematically identifying sources • Need for clearly state taxonomy objectives	*Sources:* • ETDP Steps 7e, 7c • TDR 10, 13 *Objectives:* • ETDP Steps 1-5 • TDR 1-6
Ojala, H., Penttinen, E., Collis, J., & Virtanen, T. H. (2018). Design principles for standard business reporting (sbr)taxonomy development: Evidence from Finland. *Nordic Journal of Business*, *67*(1), 4–26.	Management (standard business reporting)	3	Principles for business reporting taxonomy development	*Taxonomy building* Design principles for SBR taxonomy development: (1) competence, (2) win-win-win vision, (3) multi-channel communication, (4) intelligent scope, (5) expertise commitment, (6) track record, and (7) co-creation.	• Need for integrating several users in taxonomy design	*User integration:* • TDR 23
Sarkintudu, S. M., Ibrahim, H. H., & Abdwahab, A. B. (2018). Taxonomy development of blockchain platforms: Information systems perspectives. In *Proceedings of the 3rd International Conference on Applied Science and Technology (ICAST 2018),* Georgetown, Malaysia.	Information systems	9	Adapted method based on Nickerson et al. (2013)	*Taxonomy building* Examine subset of objects, identify general distinguishing characteristics of objects, group characteristics (empirical to deductive); conceptualise new characteristics and dimensions, examine objects, revise taxonomy (deductive to empirical). *Taxonomy evaluation* Identify missing objects in taxonomy, design new objects (use taxonomy).	• Need for taxonomy evaluation	*Evaluation:* • ETDP Steps 13-17 • TDR 6, 20-23

Reference	Discipline	Citations	Artefact	Guidance for taxonomy design	Derived lessons learned	Consideration by the ETDP and the TDR
Wang, B., & Wang, D. (2018). A Process Model for XBRL Taxonomy Development. *Journal of Signal Processing Systems*, *90*(8-9), 1213–1220.	Software engineering (business reporting language)	3	Method (eight phases) for XBLR taxonomy development	*Taxonomy building* Phases for: feasibility analysis & planning, determine scope, consider reusing existing taxonomies, architecture design, metadata repository, building, testing, usage. *Taxonomy evaluation* Testing to find errors; use of sample and real-instances.	• Need for considering taxonomy reuse • Need for taxonomy evaluation	*Reuse:* • TDR 1 *Evaluation:* • ETDP Steps 13-17 • TDR 6, 20-23
Notheisen, B., Willrich, S., Diez, M., & Weinhardt, C. (2019). Requirement-driven taxonomy development: A classification of blockchain technologies for securities post-trading. In *Proceedings of the 52th Hawaii International Conference on System Sciences (HICSS 2019),* Wailea, HI, USA.	Information systems	1	Adapted method based on Nickerson et al. (2013), algorithm	*Taxonomy building* Requirement documents as input sources; each iteration analyses a new requirement document. *Taxonomy evaluation* Authors argued for utilizing general generate/test cycle.	• Need for taxonomy evaluation	*Evaluation:* • ETDP Steps 13-17 • TDR 6, 20-23
Vu, B., & Hemmje, M. (2019). Supporting taxonomy development and evolution by means of crowdsourcing. In *Proceedings of the 11th International Conference on Knowledge Engineering and Ontology Development (KEOD 2019),* Vienna, Austria.	Computer science (crowd-sourcing)	2	Method and GitHub-driven Taxonomy Manager	*Taxonomy building* Integrate the crowd to develop new taxonomies; documenting the evolution of taxonomies.	• Need for integrating several users in taxonomy design • Need for documentation of taxonomy iterations and operations	*User integration:* • TDR 23 *Documentation:* • ETDP Step 18 • TDR 24, 25

Appendix 2: Status quo analysis

Methodological considerations on our status quo analysis

Our status quo analysis of taxonomy design in IS consists of two phases following the recommendations of Templier and Paré (2018). In the first phase, our aim was to gain insights into the operationalisation of taxonomy design, presentation, and evaluation. Given this aim, we collected a full sample of recent peer-reviewed articles building and/or evaluating a taxonomy between 2013 and 2018[1], given that Nickerson et al. (2013) had already assessed and critically reflected on taxonomy research published before 2013. We collated our sample from three sources. First, we performed a citation analysis of Nickerson et al. (2013) to cover all articles using their method. Second, we chose the wildcard search term "taxonom*", which is the most frequently used singular/plural term for describing classification schemes (Nickerson et al., 2013). We searched within the titles, abstracts, and keywords of articles in the AIS Senior Scholars' Basket of Journals and the journal Business & Information Systems Engineering[2] (BISE) to complement our sample with articles from renowned outlets. Third, we used the same search term for the titles, abstracts, and keywords of articles in the proceedings of the International (ICIS), European (ECIS), Americas (AMCIS), and Pacific Asia (PACIS) Conferences on Information Systems as well as the International Conference on Design Science Research in Information Systems and Technology (DESRIST).

From this initial result set, we removed non-English articles. Further articles were only removed if they neither build nor evaluate a taxonomy. These eliminating decisions were made in an interactive group process involving at least two and up to four co-authors at the same time. Decisions on ambiguous cases were the result of intense discussions. We removed an article if we could not find any mentioning of the term 'taxonom*' in the research method, main part, or concluding section of the article (e.g., 'taxonom*' only mentioned in the context of the related work section). Further, we removed an article if its main

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[1] The literature search and the analysis were performed during summer 2019. To analyse taxonomy articles only within full calendar years, the time span of our search ends with 2018.

[2] The journal Business & Information Systems Engineering has an impact factor (5.837) comparably high to those of the AIS Senior Scholars' Basket of Journals.

part does not contain any figure, table, visualisation, textual description, or key result, which, according to the authors of the examined article, relates to a taxonomy as research product or the evaluation of such. We designed this selection process inclusive and did not restrict it to a limited set of taxonomy appearances. This means we explicitly considered other taxonomy presentation forms besides tables and figures. This screening process resulted in a total of 164 unique articles. Please refer to Table A5 for a full list of the resulting articles.

In the second phase, for the extraction and analysis of the data from all 164 filtered taxonomy articles, we performed a three-round coding with four co-authors (referred to as 'coding team'). In the first round, each member of the coding team coded a sample of ten articles along several attributes related to taxonomy building and evaluation. The attributes are inspired by the works of Nickerson et al. (2013), Gregor and Hevner (2013), and Peffers et al. (2007) and were iteratively extended if relevant attributes emerged during the coding (e.g., systematic methodological deviations from the guidelines of Nickerson et al., 2013). As part of a workshop that took place after the first coding round, the coding team harmonised the understanding of the attributes among the members of the coding team (see Table A2) and specified coding rules to minimise subjectivity. In the second round, two co-authors each coded the remaining articles independently. In this coding round, we achieved 'substantial' (Landis & Koch, 1977) inter-rater reliability between 0.96 and 0.66 (overall average: 0.81, median: 0.81) per coding attribute (measured by Cohen's kappa adjusted with fixed marginals as suggested by Brennan and Prediger (1981). In the third round, any coding differences were discussed, clarified within the coding team, and then corrected.

To synthesise findings throughout the coding, the authors identified and discussed examples of good practice in taxonomy design as observed in the articles. This includes, for example, an appropriate mentioning and justification of all relevant design decisions, as well as an unambiguous presentation and explanation of the taxonomy itself. All observed examples of good practice, as well as methodological gaps (e.g., fields where the methodological foundation is missing, differences between extant methodological guidance and actual operationalization), informed the creation of the ETDP and the TDR.

Table A2 presents the attributes used for the descriptive analysis and the attributes' origins in both design science and taxonomy literature. Table A3 and Table A4 represent the results of this analysis and provide detailed descriptive statistics on our sample of taxonomy articles. Table A3 focuses on our status quo assessment of taxonomy building, whereas Table A4 focuses on our status quo assessment of taxonomy evaluation.

Table A2: Attributes for analysing taxonomy building and taxonomy evaluation

Attribute	**Short description**	**Origin**
Analysis of taxonomy building: research process		
Dedicated method section	The article contains a dedicated method section on the taxonomy design.	Gregor and Hevner's (2013) publication schema for a design science research study
Dedicated method reference	The article cites at least one methodological reference dedicated to the taxonomy design.	Gregor and Hevner's (2013) publication schema for a design science research study
Clear development approach	The article reports whether the taxonomy is built conceptually, empirically, or in a mixed approach.	Nickerson et al.'s (2013) taxonomy development method step 3 (decide for empirical-to-conceptual or conceptual-to empirical approach)
Clear meta-characteristic	The article reports a meta-characteristic that guides the selection of all characteristics for the taxonomy.	Nickerson et al.'s (2013) taxonomy development method step 1 (determine meta-characteristic)
Transparent number of iterations	The article reports if and how many iterations are performed to develop and revise the taxonomy.	Nickerson et al.'s (2013) demonstration of their method (reporting the taxonomy building and changes of the taxonomy for each of all seven iterations)
Transparent number of examined objects	The article reports if and how many real-world objects are analysed during the taxonomy design.	Nickerson et al.'s (2013) taxonomy development method step 4e (identify (new) subset of objects) and 5e (identify common characteristics and group objects)
Transparent ending conditions	The article reports if and how many ending conditions are determined to decide on the termination of the (iterative) taxonomy design process.	Nickerson et al.'s (2013) taxonomy development method step 2 (determine ending conditions) and step 7 (check ending conditions)
Analysis of taxonomy building: research product		
Focus of analysis	The taxonomy analyses either an established (before/around millennium) or newly emerging (last 15 years) phenomenon.	Gregor and Hevner's (2013) design science research knowledge contribution framework (according to their distinction of known and new problems)
Presentation form	The taxonomy has a specific form that determines its presentation and appearance (e.g., mathematical set, table) or is not identifiable (i.e., N/A).	Peffers et al.'s (2007) design science research methodology activity 6 (communication)

Attribute	Short description	Origin
Analysis of taxonomy building: research product (continued)		
Clear number of dimensions	The taxonomy consists of a certain number of dimensions (e.g., 1 to 3, 4 to 6) or this number is not identifiable (i.e., N/A).	Nickerson et al.'s (2013) taxonomy development method steps 4 to 6 (identify, conceptualise, and examine characteristics as well as group characteristics into dimensions)
Scale level	The taxonomy's dimensions follow a particular scale (e.g., nominal, ordinal) or this scale is not identifiable (i.e., N/A).	
Clear minimum number of characteristics	The taxonomy's dimensions each contain a minimum number of characteristics (e.g., 3 or less) or this number is not identifiable (i.e., N/A).	
Clear maximum number of characteristics	The taxonomy's dimensions each contain a maximum number of characteristics (e.g., 5 or less) or this number is not identifiable (i.e., N/A).	
Analysis of taxonomy building: research product (continued)		
Clear if mutually exclusive	The article reports whether the taxonomy's dimensions and characteristics are designed mutually exclusive.	Nickerson et al.'s (2013) taxonomy development method ("mutual exclusive restriction means that no object can have two different characteristics in a dimension", p. 341)
Clear if collectively exhaustive	The article reports whether the taxonomy's dimensions and characteristics are designed collectively exhaustive.	Nickerson et al.'s (2013) taxonomy development method ("collectively exhaustive restriction means that each object must have one of the characteristics in a dimension", p. 341)
Derivation of archetypes	Built on the taxonomy, the article derives archetypes of the objects that represent the phenomenon under consideration.	Taxonomies, more precisely their dimensions and characteristics, can serve as basis to form archetypes of objects as observed in Nickerson et al. (2013) and in our analysis of taxonomy articles.
Analysis of taxonomy evaluation		
Evaluation methods	If evaluating a taxonomy, the article reports the applied evaluation methods (e.g., expert interview).	Peffers et al.'s (2007) design science research methodology activity 5 (evaluation)
Evaluation criteria	If evaluating a taxonomy, the article reports the applied evaluation criteria (e.g., usefulness).	Peffers et al.'s (2007) design science research methodology activity 5 (evaluation)

Table A3: Descriptive statistics on the status quo of taxonomy building

Number of articles	(1) Citation analysis of Nickerson et al. (2013)	(2) Keyword search in AIS Senior Scholar's Basket of Journals + BISE	(3) Keyword search in conference proceedings[1]	Total unique articles[2]	
Analysis of taxonomy building: research process					
Dedicated method section*					
Yes	92	8	41	99	62%
No	41	7	23	61	38%
Dedicated method reference*					
Yes, contains Nickerson et al.	122	4	45	123	77%
Yes, other	3	2	4	6	4%
No, N/A	8	9	15	31	19%
Clear development approach*					
Yes, conceptual-to-empirical	18	6	11	27	17%
Yes, empirical-to-conceptual	29	4	13	35	22%
Yes, mixed	61	5	21	64	40%
No, N/A	25	0	19	34	21%
Clear meta-characteristic*					
Yes	84	4	36	85	53%
No	49	11	28	75	47%
Transparent number of iterations*					
Yes, 1 to 3	26	1	13	26	16%
Yes, 4 to 6	29	3	10	30	19%
Yes, 7 or more	8	0	3	8	5%
No, N/A	70	11	38	96	60%
Transparent number of examined objects*					
Yes, 0	3	3	3	7	4%
Yes, 1 to 99	55	4	28	63	39%
Yes, 100 to 1000	17	3	4	19	12%
Yes, over 1000	7	5	1	11	7%
No, N/A	51	0	28	60	38%
Transparent ending conditions*					
Yes	76	4	30	77	48%
No, not reported	53	11	33	79	49%
No, N/A	4	0	1	4	3%
Analysis of taxonomy building: research product					
Focus of analysis					
Established phenomenon	41	8	19	55	34%
Emerging phenomenon	92	7	45	105	66%

Number of articles	(1) Citation analysis of Nickerson et al. (2013)	(2) Keyword search in AIS Senior Scholar's Basket of Journals + BISE	(3) Keyword search in conference proceedings[1]	Total unique articles[2]	
Analysis of taxonomy building: research product (continued)					
Presentation form					
Mathematical set	1	1	0	1	1%
Matrix	5	1	5	9	6%
Table	72	6	34	84	53%
Textual	7	1	4	8	5%
Hierarchical tree	18	2	7	22	14%
Visual	16	2	8	20	13%
Mixed presentation forms	8	2	4	10	6%
N/A	6	0	2	6	4%
Clear number of dimensions*					
Yes, 1 to 4	28	5	16	38	24%
Yes, 5 to 7	29	6	24	38	23%
Yes, 8 or more	44	1	15	46	29%
N/A	32	3	9	38	24%
Scale level					
Nominal	85	10	49	102	64%
Ordinal	0	1	1	2	1%
Cardinal	0	1	0	1	1%
Mixed	19	0	5	19	12%
N/A	29	3	9	36	23%
Clear minimum number of characteristics*					
Yes, 3 or less	88	8	50	102	64%
Yes, 4 or more	4	0	0	4	3%
Yes, continuous	2	3	1	5	3%
No, N/A	39	4	13	49	31%
Clear maximum number of characteristics*					
Yes, 5 or less	55	5	32	66	41%
Yes, 6 or more	37	3	18	41	26%
Yes, infinite/continuous	3	3	2	6	4%
No, N/A	38	4	12	47	29%
Clear if mutually exclusive*					
Yes, mutually exclusive	41	6	19	47	29%
Yes, not mutually exclusive	27	0	16	29	18%
No, N/A	65	9	29	84	53%
Clear if collectively exhaustive*					
Yes, collectively exhaustive	39	6	18	44	28%
Yes, not collectively exhaustive	14	0	10	15	9%
No, N/A	80	9	36	101	63%
Derivation of archetypes*					
Yes	38	9	20	49	31%
No	95	6	44	111	69%

[1] We searched the conference proceedings of ICIS, ECIS, PACIS, AMCIS, and DESRIST.

[2] The number of total unique articles is the sum of columns (1), (2) and (3) minus duplicates.

Table A4: Descriptive statistics on the status quo of taxonomy evaluation

Number of articles	(1) Citation analysis of Nickerson et al. (2013)	(2) Keyword search in AIS Senior Scholar's Basket of Journals + BISE	(3) Keyword search in conference proceedings[1]	Total unique articles[2]	
Analysis of taxonomy evaluation					
Evaluation methods					
Illustrative scenario with real-world objects	31	2	9	32	58%
Illustrative scenario with existing research	7	2	4	8	15%
Expert interview	4	1	2	5	9%
Survey	3	1	2	4	7%
Case study	3	0	1	3	5%
Focus group	3	0	1	3	5%
Logical argument	2	0	1	3	5%
Sorting	2	0	1	2	4%
Action research	1	0	0	1	2%
Log diary	0	1	0	1	2%
Evaluation criteria[3]					
Usefulness	28	4	6	29	59%
Comprehensiveness[4]	23	2	4	23	47%
Applicability	17	2	7	19	39%
Conciseness[4]	20	2	4	20	41%
Extensibility[4]	20	2	4	20	41%
Robustness[4]	20	1	4	20	41%
Explanatory[4]	16	1	3	16	33%
Completeness	8	1	2	8	16%
Collective exhaustiveness	6	0	2	6	12%
Mutual exclusiveness	6	0	2	6	12%
Understandability	5	2	2	6	12%
Distinctiveness	4	0	3	4	8%
Efficiency	4	0	2	4	8%
Utility	3	0	3	4	8%
Consistency	2	0	2	2	4%
Construct validity	2	1	1	2	4%
Effectiveness	2	0	0	2	4%
Reliability	2	0	1	2	4%
Repeatability	2	0	0	2	4%
Sufficiency	2	0	0	2	4%
Uniqueness	2	0	0	2	4%
Validity	2	0	0	2	4%
Adequateness	1	0	0	1	2%
Appropriate wording	1	0	0	1	2%
Compatibility with theories	1	0	0	1	2%
Descriptiveness	1	0	0	1	2%
Number of articles	(1) Citation analysis of	(2) Keyword search in AIS	(3) Keyword search in	Total unique articles[2]	

	Nickerson et al. (2013)	Senior Scholar's Basket of Journals + BISE	conference proceedings[1]		
Analysis of taxonomy evaluation (continued)					
Evaluation criteria[3] (continued)					
Exhaustiveness	1	0	0	1	2%
Feasibility	1	0	0	1	2%
Generalizability	1	0	0	1	2%
Inclusiveness	1	0	0	1	2%
Modifiability	1	1	0	1	2%
Purposefulness	1	0	0	1	2%
Real-world fidelity	1	0	1	1	2%
Relevance	1	0	0	1	2%
Simplicity	1	1	0	1	2%
Stability	1	0	0	1	2%
Sufficient detailedness	1	0	1	1	2%
Suitability	1	0	0	1	2%
Unambiguousness	1	0	0	1	2%
Usability	1	0	0	1	2%
Versatileness	1	0	0	1	2%

[1] We searched the conference proceedings of ICIS, ECIS, PACIS, AMCIS, and DESRIST.
[2] The number of total unique articles is the sum of columns (1), (2) and (3) minus duplicates.
[3] Evaluation criteria are non-exclusive and, therefore, more than one criterion could be observed at an article.
[4] Subjective ending conditions suggested by Nickerson et al. (2013)

References of the analysed taxonomy articles

Table A5 provides an overview of the specific taxonomy articles assessed in our status quo analysis.

Table A5: References of the analysed taxonomy articles

Reference of analysed taxonomy article	Taxonomy is built	Taxonomy is evaluated
Addas S, Pinsonneault A (2015) The many faces of information technology interruptions: A taxonomy and preliminary investigation of their performance effects. Information Systems Journal 25:231–273	Yes	Yes
Agogo D, Hess TJ, Te'eni D, McCoy S (2018) "How does tech make you feel?": A review and examination of negative affective responses to technology use. European Journal of Information Systems 27:570–599	No	Yes
Ahmed M, Litchfield AT, Ahmed S (2014) A generalized threat taxonomy for cloud computing. In: Proceedings of the 25th Australasian Conference on Information Systems (ACIS 2014)	Yes	No
Al-Barak M, Bahsoon R (2016) Database design debts through examining schema evolution. In: Proceedings of the International Workshop on Managing Technical Debt (MTD 2016)	Yes	No
Almahdi M, Archer-Brown C, Panteli N (2015) Developing a typology of social commerce websites: An exploratory study. In: Proceedings of the 48th Academy of Marketing Conference (AM 2015)	Yes	No
Almufareh M, Abaoud D, Moniruzzaman M (2018) Taxonomy development for virtual reality (VR) technologies in healthcare sector. In: Proceedings of the 13th International Conference on Design Science Research in Information Systems and Technology (DESRIST 2018)	Yes	Yes
Almufareh M, Abaoud D, Moniruzzaman M (2018) Taxonomy development for virtual reality technologies in healthcare sector. In: Chatterjee S, Dutta K, Sundarraj RP (eds) Designing for a digital and globalized World. Cham, Switzerland, 146–156	Yes	Yes
Alrige M, Chatterjee S (2015) Toward a taxonomy of wearable technologies in healthcare. In: Proceedings of the 10th International Conference on Design Science Research in Information Systems and Technology (DESRIST 2015)	Yes	Yes
Amrit C, Wijnhoven F, Beckers D (2015) Information waste on the world wide web and combating the clutter. In: Proceedings of the 23rd European Conference on Information Systems (ECIS 2015)	Yes	No
Aysha Beevi FH, Wagner S, Hallerstede S, Pedersen CF (2015) Data quality oriented taxonomy of ambient assisted living systems. In: Proceedings of the 1st IET International Conference on Technologies for Active and Assisted Living (TechAAL 2015)	Yes	Yes
Bärenfänger R, Drayer E, Daniluk D, Otto B, Vanet E, Caire R, Abbas TS, Lisanti B (2016) Classifying flexibility types in smart electric distribution grids: A taxonomy. In: Proceedings of the CIRED Workshop (CIRED 2016)	Yes	Yes
Barn R, Barn B (2016) An ontological representation of a taxonomy for cybercrime. In: Proceedings of the 24th European Conference on Information Systems (ECIS 2016)	Yes	Yes
Becker M, Matt C, Widjaja T, Hess T (2017) Understanding privacy risk perceptions of consumer health wearables: An empirical taxonomy. In: Proceedings of the 38th International Conference on Information Systems (ICIS 2017)	Yes	No

Reference of analysed taxonomy article	Taxonomy is built	Taxonomy is evaluated
Beinke JH, Nguyen D, Teuteberg F (2018) Towards a business model taxonomy of startups in the finance sector using blockchain. In: Proceedings of the 39th International Conference on Information Systems (ICIS 2018)	Yes	No
Benedict M, Herrmann H, Esswein W (2018) Ehealth-platforms: The case of Europe. Studies in Health Technology and Informatics 247:241–245	Yes	No
Bhattacherjee A, Davis CJ, Connolly AJ, Hikmet N (2018) User response to mandatory IT use: A coping theory perspective. European Journal of Information Systems 27:395–414	Yes	No
Bock M, Wiener M (2017) Towards a taxonomy of digital business models: A conceptual dimensions and empirical illustrations. In: Proceedings of the 38th International Conference on Information Systems (ICIS 2017)	Yes	Yes
Botha A, Weiss M, Herselman M (2018) Towards a taxonomy of mHealth. In: Proceedings of the International Conference on Advances in Big Data, Computing and Data Communication Systems (icABCD 2018)	Yes	Yes
Brauer B, Ebermann C, Hildebrandt B, Remané G, Kolbe LM (2016) Green by app: The contribution of mobile applications to environmental sustainability. In: Proceedings of the 20th Pacific Asia Conference on Information Systems (PACIS 2016)	Yes	No
Brockmann T, Krüger N, Stieglitz S, Bohlsen I (2013) A framework for collaborative augmented reality applications. In: Proceedings of the 19th Americas Conference on Information Systems (AMCIS 2013)	Yes	Yes
Brosius M, Aier S (2016) The impact of enterprise architecture management on design decisions in IS change projects. In: Proceedings of the Multikonferenz Wirtschaftsinformatik (MKWI 2016)	Yes	No
Brosius M, Haki KM, Aier S (2016) Themes of coordination in IS reference theories. In: Proceedings of the 24th European Conference on Information Systems (ECIS 2016)	Yes	No
Caroli MG, Fracassi E, Maiolini R, Pulino SC (2018) Exploring social innovation components and attributes: A taxonomy proposal. Journal of Social Entrepreneurship 9:94–109	Yes	No
Carroll N, O'Connor M, Edison H (2018) A review on the identification and classification of impediments in software flow. In: Proceedings of the 24th Americas Conference on Information Systems (AMCIS 2018)	Yes	No
Chasin F, Hoffen M von, Cramer M, Matzner M (2018) Peer-to-peer sharing and collaborative consumption platforms: A taxonomy and a reproducible analysis. Information Systems and e-Business Management 16:293–325	Yes	Yes
Chitra S, Kwok RC-W (2016) Social persuasive education cloud model: A case study. In: Proceedings of the 20th Pacific Asia Conference on Information Systems (PACIS 2016)	Yes	No
Cledou G, Estevez E, Soares Barbosa L (2018) A taxonomy for planning and designing smart mobility services. Government Information Quarterly 35:61–76	Yes	Yes
Cullina E, Conboy K, Morgan L (2015) Measuring the crowd: A preliminary taxonomy of crowdsourcing metrics. In: Proceedings of the 11th International Symposium on Open Collaboration (OpenSym 2015)	Yes	No
Daniel S, Midha V, Bhattacherhjee A, Sing SP (2018) Sourcing knowledge in open source software projects: The impacts of internal and external social capital on project success. The Journal of Strategic Information Systems 27:237–256	Yes	No
Debortoli S, Müller O, Brocke J vom (2014) Comparing business intelligence and big data skills: A text mining study using job advertisements. Business & Information Systems Engineering 6:289–300	Yes	No
Degrossi LC, Porto de Albuquerque J, Santos Rocha R dos, Zipf A (2018) A taxonomy of quality assessment methods for volunteered and crowdsourced geographic information. Transactions in GIS 22:542–560	Yes	No

Reference of analysed taxonomy article	Taxonomy is built	Taxonomy is evaluated
Dellermann D, Calma A, Lipusch N, Weber T, Weigel S, Ebel P (2019) The future of human-AI collaboration: A taxonomy of design knowledge for hybrid intelligence systems. In: Proceedings of the 52th Hawaii International Conference on System Sciences (HICSS 2019)	Yes	No
Dellermann D, Lipusch N, Ebel PA, Popp KM, Leimeister JM (2017) Finding the unicorn: Predicting early stage startup success through a hybrid intelligence method. In: Proceedings of the 38th International Conference on Information Systems (ICIS 2017)	Yes	No
Diniz EH, Siqueira ES, van Heck E (2018) Taxonomy of digital community currency platforms. Information Technology for Development 16:1–23	Yes	Yes
Domínguez E, Pérez B, Rubio AL, Zapata MA (2019) A taxonomy for key performance indicators management. Computer Standards & Interfaces 64:24–40	Yes	Yes
Drasch BJ, Schweizer A, Urbach N (2018) Integrating the 'troublemakers': A taxonomy for cooperation between banks and fintechs. Journal of Economics and Business 100:26–42	Yes	No
Dremel C, Stöckli E, Wulf J, Herrmann A (2018) Archetypes of data analytics providers in the big data era. In: Proceedings of the 24th Americas Conference on Information Systems (AMCIS 2018)	Yes	No
Edelen A, Ingwersen WW, Rodríguez C, Alvarenga RAF, Almeida AR de (2018) Critical review of elementary flows in LCA data. The International Journal of Life Cycle Assessment 23:1261-1273	Yes	No
Eitiveni I, Kurnia S, Buyya R (2017) Sustainable supply chain management: Taxonomy, gaps, and future directions. In: Proceedings of the 21st Pacific Asia Conference on Information Systems (PACIS 2017)	Yes	No
Ellerweg R (2018) Make frame rate studies useful for system designers. In: Proceedings of the 1st International Conference on Graphics and Interaction (ICGI 2018)	Yes	Yes
Engelbrecht A, Gerlach J, Widjaja T (2016) Understanding the anatomy of data-driven business models: Towards an empirical taxonomy. In: Proceedings of the 24th European Conference on Information Systems (ECIS 2016)	Yes	No
Fellmann M, Koschmider A, Laue R, Schoknecht A, Vetter A (2017) A taxonomy and catalog of business process model patterns. In: Proceedings of the 22nd European Conference on Pattern Languages of Programs (EuroPLoP 2017)	Yes	No
Fellmann M, Robert S, Büttner S, Mucha H, Röcker C (2017) Towards a framework for assistance systems to support work processes in smart factories. In: Proceedings of the IFIP International Cross-Domain Conference for Machine Learning and Knowledge Extraction (CD-MAKE 2017)	Yes	Yes
Fteimi N, Cai J, Basten D (2017) A taxonomy of information system projects' knowledge-sharing mechanisms. Communications of the Association for Information Systems 41:611–638	Yes	No
Fteimi N, Lehner F (2018) Analysing and classifying knowledge management publications: A proposed classification scheme. Journal of Knowledge Management 22:1527–1554	Yes	Yes
Gao F, Thiebes S, Sunyaev A (2018) Rethinking the meaning of cloud computing for health care: A taxonomic perspective and future research directions. Journal of Medical Internet Research 20:1-27	Yes	Yes
Ge J, Gretzel U (2018) A taxonomy of value co-creation on Weibo: A communication perspective. International Journal of Contemporary Hospitality Management 30:2075–2092	Yes	Yes
Ge J, Gretzel U (2018) EmojI rhetoric: A social media influencer perspective. Journal of Marketing Management 34:1272–1295	Yes	No
Geiger D (2016) Crowdsourcing systems. In: Geiger D (ed) Personalized task recommendation in crowdsourcing systems. Springer, Basel, Switzerland, 7–14	Yes	No

Reference of analysed taxonomy article	Taxonomy is built	Taxonomy is evaluated
Gembarski PC, Schoormann T, Schreiber D, Knackstedt R, Lachmayer R (2017) Effects of mass customization on sustainability: A literature-based analysis. In: Hankammer S, Nielsen K, Piller FT, Schuh G, Wang N (eds) Customization 4.0: Proceedings of the 9th World Mass Customization & Personalization Conference (MCPC 2017)	Yes	No
Gerber A, Baskerville R, van der Merwe A (2017) A taxonomy of classification approaches in IS research. In: Proceedings of the 23rd Americas Conference on Information Systems (AMCIS 2017)	No	Yes
Gibbs C, Gretzel U, Saltzman J (2016) An experience-based taxonomy of branded hotel mobile application features. Information Technology & Tourism 16:175–199	Yes	Yes
Gimpel H, Rau D, Röglinger M (2018) Understanding FinTech start-ups: A taxonomy of consumer-oriented service offerings. Electronic Markets 28:245–264	Yes	Yes
Glaser F, Bezzenberger L (2015) Beyond cryptocurrencies: A taxonomy of decentralized consensus systems. In: Proceedings of the 23rd European Conference on Information Systems (ECIS 2015)	Yes	No
Grahn K, Westerlund M, Pulkkis G (2017) Analytics for network security: A survey and taxonomy. In: Alsmadi IM, Karabatis G, Aleroud A (eds) Information fusion for cyber-security analytics. Springer, Cham, Switzerland, 175-193	Yes	No
Grochol P, Schneider S, Sunyaev A (2014) Cutting through the jungle of cloud computing whitepapers: Development of an evaluation model. In: Krcmar H, Reussner R, Rumpe B (eds) Trusted cloud computing. Springer, Cham, Switzerland, 315–331	Yes	No
Haas P, Blohm I, Leimeister JM (2014) An empirical taxonomy of crowdfunding intermediaries. In: Proceedings of the 35th International Conference on Information Systems (ICIS 2014)	Yes	No
Hanelt A, Hildebrandt B, Polier J (2015) Uncovering the role of IS in business model innovation: A taxonomy-driven approach to structure the field. In: Proceedings of the 23rd European Conference on Information Systems (ECIS 2015)	Yes	No
Hauff S, Veit D, Tuunainen V (2015) Towards a taxonomy of perceived consequences of privacy-invasive practices. In: Proceedings of the 23rd European Conference on Information Systems (ECIS 2015)	Yes	No
Herterich MM, Buehnen T, Uebernickel F, Brenner W (2016) A taxonomy of industrial service systems enabled by digital product innovation. In: Proceedings of the 49th Hawaii International Conference on System Sciences (HICSS 2016)	Yes	Yes
Herterich MM, Holler M, Uebernickel F, Brenner W (2015) Understanding the business value: Towards a taxonomy of industrial use scenarios enabled by cyber-physical systems in the equipment manufacturing industry. In: Proceedings of the International Conference on Information Resources Management (Conf-IRM 2015)	Yes	No
Holland CP, Gutiérrez-Leefmans M (2018) A taxonomy of SME e-commerce platforms derived from a market-level analysis. International Journal of Electronic Commerce 22:161–201	Yes	No
Holler M, Neiditsch G, Uebernickel F, Brenner W (2017) Digital product innovation in manufacturing industries: Towards a taxonomy for feedback-driven product development scenarios. In: Proceedings of the 50th Hawaii International Conference on System Sciences (HICSS 2017)	Yes	No
Holler M, Uebernickel F, Brenner W (2017) Defining archetypes of e-collaboration for product development in the automotive industry. In: Proceedings of the 25th European Conference on Information Systems (ECIS 2017)	Yes	Yes
Hors-Fraile S, Rivera-Romero O, Schneider F, Fernandez-Luque L, Luna-Perejon F, Civit-Balcells A, Vries H de (2018) Analyzing recommender systems for health promotion using a multidisciplinary taxonomy: A scoping review. International Journal of Medical Informatics 114:143–155	Yes	No

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Hülsdau M, Teuteberg F (2018) Towards a taxonomy of algorithmic attribution models: Which is the right model to measure, manage and optimize multiple campaigns? In: Proceedings of the Multikonferenz Wirtschaftsinformatik (MKWI 2018)	Yes	No
Hummel D, Schacht S, Mädche A (2016) Determinants of multi-channel behavior: Exploring avenues for future research in the services industry. In: Proceedings of the 37th International Conference on Information Systems (ICIS 2016)	Yes	Yes
Jiang D, Jiang L, London J, Grover V, Sun H (2016) Taking ownership of borrowed theories: The case of transaction cost theory. In: Proceedings of the 37th International Conference on Information Systems (ICIS 2016)	Yes	No
Jiang Y, Schlagwein D, Benatallah B (2018) A review on crowdsourcing for education: State of the art of literature and practice. In: Proceedings of the 22nd Pacific Asia Conference on Information Systems (PACIS 2018)	Yes	No
Jöhnk J, Röglinger M, Thimmel M, Urbach N (2017) How to implement agile IT setups: A taxonomy of design options. In: Proceedings of the 25th European Conference on Information Systems (ECIS 2017)	Yes	Yes
Kazan E, Tan C-W, Lim ETK, Sørensen C, Damsgaard J (2018) Disentangling digital platform competition: The case of UK mobile payment platforms. Journal of Management Information Systems 35:180–219	Yes	No
Kees A, Oberländer AM, Röglinger M, Rosemann M (2015) Understanding the internet of things: A conceptualisation of business-to-thing (B2T) Interactions. In: Proceedings of the 23rd European Conference on Information Systems (ECIS 2015)	Yes	No
Keller R, König C (2014) A reference model to support risk identification in cloud networks. In: Proceedings of the 35th International Conference on Information Systems (ICIS 2014)	Yes	Yes
Khalilijafarabad A, Helfert M, Ge M (2016) Developing a data quality research taxonomy: An organizational perspective. In: Proceedings of the 21st International Conference on Information Quality (ICIQ 2016)	Yes	Yes
Kokol P (2018) Point systems in games for health: A bibliometric scoping study. SSRN Electronic Journal:1–6	Yes	No
Kopper A, Westner M (2016) Towards a taxonomy for shadow IT. In: Proceedings of the 22nd Americas Conference on Information Systems (AMCIS 2016)	Yes	No
Küpper T, Jung R, Lehmkuhl T, Wieneke A (2014) Features for social CRM technology: An organizational perspective. In: Proceedings of the 20th Americas Conference on Information Systems (AMCIS 2014)	Yes	Yes
Kunst K, Vatrapu R (2014) Towards a theory of socially shared consumption: Literature review, taxonomy, and research agenda. In: Proceedings of the 22rd European Conference on Information Systems (ECIS 2014	Yes	No
Kutzner K, Schoormann T, Knackstedt R (2018) Digital transformation in information systems research: A taxonomy-based approach to structure the field. In: Proceedings of the 26th European Conference on Information Systems (ECIS 2018)	Yes	No
Krieger F, Drews P (2018) Leveraging big data and analytics for auditing: Towards a taxonomy. In: Proceedings of the 39th International Conference on Information Systems (ICIS 2018)	Yes	No
Kwok L, Yu B (2016) Taxonomy of facebook messages in business-to-consumer communications: What really works? Tourism and Hospitality Research 16:311–328	Yes	No
Labazova O, Dehling T, Sunyaev A (2019) From hype to reality: A taxonomy of blockchain applications. In: Proceedings of the 52th Hawaii International Conference on System Sciences (HICSS 2019)	Yes	Yes
Land L, Smith S, Winchester D, Pang V (2014) The construction of identity offences taxonomy: An Australian context. In: Proceedings of the 25th Australasian Conference on Information Systems (ACIS 2014)	Yes	Yes
Leicht N, Durward D, Haas P, Zogaj S, Blohm I, Leimeister JM (2016) An empirical taxonomy of crowdsourcing intermediaries. In: Proceedings of the Academy of Management Annual Meeting	Yes	No

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Levina O (2017) Deriving content for an electricity and mobility platform: Digital spaces as drivers for sustainable mobility. In: Proceedings of the Conference on Environmental Informatics (EnviroInfo 2017)	Yes	No
Lewis R, Louvieris P, Abbott P, Clewley N, Jones K (2014) Cybersecurity information sharing: A framework for sustainable information security management in uk sme supply chains. In: Proceedings of the 22rd European Conference on Information Systems (ECIS 2014)	Yes	No
Liu C, Talaei-Khoei A, Zowghi D (2018) Theoretical support for enhancing data quality: Application in electronic medical records. In: Proceedings of the 24th Americas Conference on Information Systems (AMCIS 2018)	Yes	No
Liu X, Werder K, Mädche A (2016) A taxonomy of digital service design techniques. In: Proceedings of the 37th International Conference on Information Systems (ICIS 2016)	Yes	No
Liu, D., Santhanam, R., & Webster, J. (2017) Toward meaningful engagement: A framework for design and research of gamified information systems. MIS Quarterly 41:1011–1034	Yes	No
Lu Y, Gupta A, Ketter W, van Heck E (2016) Exploring bidder heterogeneity in multichannel sequential B2B auctions. MIS Quarterly 40:645–662	Yes	No
Mayer P (2017) A taxonomy of cross-language linking mechanisms in open source frameworks. Computing 99:701–724	Yes	No
Melas CD, Zampetakis LA, Dimopoulou A, Moustakis VS (2014) An empirical investigation of technology readiness among medical staff based in greek hospitals. European Journal of Information Systems 23:672–690	No	Yes
Mrass V, Li MM, Peters C (2017) Towards a taxonomy of digital work. In: Proceedings of the 25th European Conference on Information Systems (ECIS 2017)	Yes	No
Mrosek R, Dehling T, Sunyaev A (2015) Taxonomy of health IT and medication adherence. Health Policy and Technology 4:215–224	Yes	No
Müller MP, Meier C, Kundisch D, Zimmermann S (2015) Interactions in is project portfolio selection: Status quo and perspectives. In: Proceedings of the 12th International Conference on Wirtschaftsinformatik (WI 2015)	Yes	No
Mwilu OS, Prat N, Comyn-Wattiau I (2015) Taxonomy development for complex emerging technologies: The case of business intelligence and analytics on the cloud. In: Proceedings of the 19th Pacific Asia Conference on Information Systems (PACIS 2015)	Yes	No
Nadj M, Schieder C (2017) Towards a taxonomy of real-time business intelligence systems. In: Proceedings of the 25th European Conference on Information Systems (ECIS 2017)	Yes	No
Nakatsu RT, Grossman EB, Iacovou CL (2014) A taxonomy of crowdsourcing based on task complexity. Journal of Information Science 40:823–834	Yes	No
Nickerson RC, Varshney U, Muntermann J (2013) A method for taxonomy development and its application in information systems. European Journal of Information Systems 22:336–359	Yes	No
Oberländer AM, Röglinger M, Rosemann M, Kees A (2018) Conceptualizing business-to-thing interactions: A sociomaterial perspective on the internet of things. European Journal of Information Systems 27:486–502	Yes	Yes
Paredes H, Barroso J, Bigham JP (2018) All (of us) can help: Inclusive crowdfunding research trends and future challenges. In: Proceedings of the 22nd International Conference on Computer Supported Cooperative Work in Design (CSCWD 2018)	Yes	No
Prat N, Comyn-Wattiau, Akoka J (2014) Artifact evaluation in information systems design-science research: A holistic view. In: Proceedings of the 18th Pacific Asia Conference on Information Systems (PACIS 2014)	Yes	No

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Prat N, Comyn-Wattiau I, Akoka J (2015) A taxonomy of evaluation methods for information systems artifacts. Journal of Management Information Systems 32:229–267	Yes	Yes
Petzold M, Barbabella F, Bobeth J, Kern D, Mayer C (2013) Towards an ambient assisted living user interaction taxonomy. In: Proceedings of the Conference on Human Factors in Computing Systems (CHI 2013)	Yes	No
Posey C, Raja U, Crossler RE, Burns AJ (2017) Taking stock of organisations' protection of privacy: Categorising and assessing threats to personally identifiable information in the USA. European Journal of Information Systems 26:585–604	Yes	No
Posey C, Roberts TL, Lowry PB, Bennett RJ, Courtney JF (2013) Insiders' protection of organizational information assets: Development of a systematics-based taxonomy and theory of diversity for protection-motivated behaviors. MIS Quarterly 37:1189–1210	Yes	No
Püschel L, Röglinger M, Schlott H (2016) What's in a smart thing? Development of a multi-layer taxonomy. In: Proceedings of the 37th International Conference on Information Systems (ICIS 2016)	Yes	Yes
Raza U, Ahmad W, Khan A (2018) Transformation from manufacturing process taxonomy to repair process taxonomy: A phenetic approach. Journal of Industrial Engineering International 14:415–428	Yes	Yes
Remané G, Hanelt A, Nickerson RC, Kolbe LM (2017) Discovering digital business models in traditional industries. Journal of Business Strategy 38:41–51	Yes	No
Remané G, Hanelt A, Tesch JF, Kolbe LM (2017) The business model pattern database: A tool for systematic business model innovation. International Journal of Innovation Management 21:1–61	Yes	No
Remané G, Hanelt A, Tesch JF, Nickerson RC, Kolbe LM (2016) A taxonomy of carsharing business models. In: Proceedings of the 37th International Conference on Information Systems (ICIS 2016)	Yes	No
Reuben J, Martucci LA, Fischer-Hübner S (2015) Automated log audits for privacy compliance validation: A literature survey. In: Privacy and identity management. Time for a revolution?: Proceedings of the International Summer School on Privacy and Identity Management (IFIP 2015)	Yes	No
Rizk A, Bergvall-Kåreborn B, Elragal A (2018) Towards a taxonomy for data-driven digital services. In: Proceedings of the 51st Hawaii International Conference on System Sciences (HICSS 2018)	Yes	No
Roeder J, Cardona DR, Palmer M, Werth O, Muntermann J, Breitner MH (2018) Make or Break: Business model determinants of FinTech venture success. In: Proceedings of the Multikonferenz Wirtschaftsinformatik (MKWI 2018)	No	Yes
Schäffer T, Stelzer D (2017) Towards a taxonomy for coordinating quality of master data in product information sharing. In: Proceedings of the 22nd MIT International Conference on Information Quality	Yes	Yes
Schmidt-Kraepelin M, Thiebes S, Tran MC, Sunyaev A (2018) What's in the game?: Developing a taxonomy of gamification concepts for health apps. In: Proceedings of the 51st Hawaii International Conference on System Sciences (HICSS 2018)	Yes	No
Schneider JA, Holland CP (2017) Ehealth search patterns: A comparison of private and public health care markets using online panel data. Journal of Medical Internet Research 19:e117	Yes	No
Schneider S, Lansing J, Gao F, Sunyaev A (2014) A taxonomic perspective on certification Schemes: Development of a taxonomy for cloud service certification criteria. In: Proceedings of the 47th Hawaii International Conference on System Sciences (HICSS 2014)	Yes	Yes
Schöbel S, Janson A (2018) Is it all about having fun? Developing a taxonomy to gamify information systems. In: Proceedings of the 26th European Conference on Information Systems (ECIS 2018)	Yes	No

Reference of analysed taxonomy article	Taxonomy is built	Taxonomy is evaluated
Schoormann T, Behrens D, Knackstedt R (2017) Sustainability in business process models: A taxonomy-driven approach to synthesize knowledge and structure the field. In: Proceedings of the 38th International Conference on Information Systems (ICIS 2017)	Yes	No
Schryen G, Wagner G, Benlian A (2015) Theory of knowledge for literature reviews: An epistemological model, taxonomy and empirical analysis of is literature. In: Proceedings of the 36th International Conference on Information Systems (ICIS 2015)	Yes	No
Seyffarth T, Kühnel S, Sackmann S (2017) A taxonomy of compliance processes for business process compliance. In: Carmona J, Engels G, Kumar A (eds) Business process management forum. Springer, Cham, Switzerland, 71–87	Yes	Yes
Siering M, Clapham B, Engel O, Gomber P (2017) A taxonomy of financial market manipulations: Establishing trust and market integrity in the financialized economy through automated fraud detection. Journal of Information Technology 32:251–269	Yes	Yes
Silic M, Back A, Silic D (2015) Taxonomy of technological risks of open source software in the enterprise adoption context. Information & Computer Security 23:570–583	Yes	No
Snow NM, Reck JL (2016) Developing a government reporting taxonomy. Journal of Information Systems 30:49–81	Yes	Yes
Spagnoletti P, Za S, Winter R (2013) Exploring foundations for using simulations in IS research. In: Proceedings of the 34th International Conference on Information Systems (ICIS 2013)	Yes	No
Stoeckli E, Uebernickel F, Brenner W (2017) Capturing functional affordances of enterprise social software. In: Proceedings of the 23rd Americas Conference on Information Systems (AMCIS 2017)	Yes	Yes
Straker K, Wrigley C, Rosemann M (2015) Typologies and touchpoints: Designing multI-channel digital strategies. Journal of Research in Interactive Marketing 9:110–128	Yes	No
Strasser A (2016) DelphI method variants in is research: A taxonomy proposal. In: Proceedings of the 20th Pacific Asia Conference on Information Systems (PACIS 2016)	Yes	No
Strasser A (2017) Delphi method variants in information systems research: Taxonomy development and application. Electronic Journal of Business Research Methods 15:120–133	Yes	Yes
Strode DE (2016) A dependency taxonomy for agile software development projects. Information Systems Frontiers 18:23–46	Yes	Yes
Susha I, Janssen M, Verhulst S (2017) Data collaboratives as a new frontier of cross-sector partnerships in the age of open data: Taxonomy development. In: Proceedings of the 50th Hawaii International Conference on System Sciences (HICSS 2017)	Yes	No
Svee E-O, Zdravkovic J (2015) Case-based development of consumer preferences using brand personality and values co-creation. In: The Practice of Enterprise Modeling: Proceedings of the Working Conference on The Practice of Enterprise Modeling (IFIP 2015)	Yes	No
Svee E-O, Zdravkovic J (2015) Towards a consumer preference-based taxonomy for information systems development. In: Proceedings of the 6th International Conference on Business Informatics Research (BIR 2015)	Yes	No
Syed R (2019) Enterprise reputation threats on social media: A case of data breach framing. The Journal of Strategic Information Systems 28:257–274	Yes	No
Szopinski D, Schoormann T, John T, Knackstedt R, Kundisch D (2017) How software can support innovating business models: A taxonomy of functions of business model development tools. In: Proceedings of the 23rd Americas Conference on Information Systems (AMCIS 2017)	Yes	Yes

Reference of analysed taxonomy article	Taxonomy is built	Taxonomy is evaluated
Terrenghi N, Schwarz J, Legner C (2017) Representing business models in primarily physical industries: An ecosystem perspective. In: Research in Progress Proceedings of the 12th International Conference on Design Science Research in Information Systems and Technology (DESRIST 2017)	Yes	No
Terrenghi N, Schwarz N, Legner C (2018) Towards design elements to represent business models for cyber physical systems. In: Proceedings of the 26th European Conference on Information Systems (ECIS 2018)	Yes	Yes
Thiebes S, Kleiber G, Sunyaev A (2017) Cancer genomics research in the cloud: A taxonomy of genome data sets. In: Proceedings of the 4th International Workshop on Genome Privacy and Security (GenoPri 2017)	Yes	Yes
Tilly R, Posegga O, Fischbach K, Schoder D (2017) Towards a conceptualization of data and information quality in social information systems. Business & Information Systems Engineering 59:3–21	Yes	Yes
Traumer F, Oeste-Reiß S, Leimeister JM (2017) Towards a future reallocation of work between humans and machines: Taxonomy of tasks and interaction types in the context of machine learning. In: Proceedings of the 38th International Conference on Information Systems (ICIS 2017)	Yes	No
Tönnissen S, Teuteberg F (2018) Towards a taxonomy for smart contracts. In: Proceedings of the 26th European Conference on Information Systems (ECIS 2018)	Yes	Yes
Varshney U (2014) Mobile health: Four emerging themes of research. Decision Support Systems 66:20–35	Yes	No
Varshney U, Nickerson RC, Muntermann J (2013) Taxonomy development in health-IT. In: Proceedings of the 19th Americas Conference on Information Systems (AMCIS 2013)	Yes	No
Vilnai-Yavetz I, Levina O (2018) Motivating social sharing of e-business content: Intrinsic motivation, extrinsic motivation, or crowding-out effect? Computers in Human Behavior 79:181–191	Yes	No
Wall JD, Iyer L, Salam AF (2013) Are conceptualizations of employee compliance and noncompliance in information security research adequate? Developing taxonomies of compliance and noncompliance. In: Proceedings of the 19th Americas Conference on Information Systems (AMCIS 2013)	Yes	No
Wan P-HM, Chang TTK, Sengupta A (2013) An icon taxonomy for semI-literate communities. In: Proceedings of the 19th Americas Conference on Information Systems (AMCIS 2013)	Yes	No
Weerasinghe K, Scahill SL, Taskin N, Pauleen, D. J. (2018) Development of a taxonomy to be used by business-IT alignment researchers. In: Proceedings of the 22nd Pacific Asia Conference on Information Systems (PACIS 2018)	Yes	Yes
Weinmann M, Schneider C, Robra-Bissantz S (2013) A taxonomy of web personalization. In: Proceedings of the 19th Americas Conference on Information Systems (AMCIS 2013)	Yes	Yes
Weking J, Hein A, Böhm M, Krcmar H (2018) A hierarchical taxonomy of business model patterns. Electronic Markets 30:447–468.	Yes	Yes
Weking J, Stöcker M, Kowalkiewicz M, Böhm M, Krcmar H (2018) Archetypes for industry 4.0 business model innovations. In: Proceedings of the 24th Americas Conference on Information Systems (AMCIS 2018)	Yes	No
Werder K, Wang H-Y (2016) Towards a software product industry classification. In: Proceedings of the 15th International Conference on Intelligent Software Methodologies, Tools and Techniques (SoMeT 2016)	Yes	Yes
Witte A.-K., Zarnekow R (2018) Is open always better? A taxonomy-based analysis of platform ecosystems for fitness trackers. In: Proceedings of the Multikonferenz Wirtschaftsinformatik (MKWI 2018)	Yes	No

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Yang A, Varshney U (2016) A taxonomy for mobile health implementation and evaluation. In: Proceedings of the 22nd Americas Conference on Information Systems (AMCIS 2016)	Yes	No
Yang AT, Varshney U (2017) Categorizing mobile health project evaluation techniques. In: Proceedings of the 23rd Americas Conference on Information Systems (AMCIS 2017)	Yes	No
Yassaee M, Mettler T (2015) The current state of and possible future avenues for it value research: A review of the past 10 years. In: Proceedings of the 23rd European Conference on Information Systems (ECIS 2015)	Yes	No
Za S, Spagnoletti P, Winter R, Mettler T (2018) Exploring foundations for using simulations in IS research. Communications of the Association for Information Systems 42:268–300	Yes	No
Zainuddin E, Staples S (2016) Developing a shared taxonomy of workaround behaviors for the information systems field. In: Proceedings of the 49th Hawaii International Conference on System Sciences (HICSS 2016)	Yes	No
Zelt S, Schmiedel T, vom Brocke J (2018) Understanding the nature of processes: An information-processing perspective. Business Process Management Journal 24:67–88	Yes	No
Zhang P (2013) The affective response model: A theoretical framework of affective concepts and their relationships in the ICT context. MIS Quarterly 37:247–274	Yes	No
Zijp MC, Heijungs R, van der Voet E, van de Meent D, Huijbregts MAJ, Hollander A, Posthuma L (2015) An identification key for selecting methods for sustainability assessments. Sustainability 7:2490–2512	Yes	No
Zrenner J, Hassan AP, Otto B, Marx Gómez JC (2017) Data source taxonomy for supply network structure visibility. In: Proceedings of the Hamburg International Conference of Logistics (HICL 2017)	Yes	Yes
Zschech P (2018) A taxonomy of recurring data analysis problems in maintenance analytics. In: Proceedings of the 26th European Conference on Information Systems (ECIS 2018)	Yes	No

Appendix 3: Taxonomy evaluation

The extended taxonomy design process (ETDP), which is described in detail in section 5, involves the configuration and performance of a taxonomy evaluation (Steps 15 to 17 of the ETDP). To support taxonomy designers, we provide an overview of taxonomy-related methods and criteria for operational guidance when configuring and performing taxonomy evaluation (see Table A6 and Table A7).

Table A6: Taxonomy-related evaluation methods

DSR evaluation method identified by Prat et al. (2015)		**Frequency of taxonomy evaluation method in our sample**	**Example references**
Observational or participatory	Case study	3 (5%)	Holler et al. (2017), Raza et al. (2018), Zrenner et al. (2017)
	Field study[3]	1 (2%)	Addas and Pinsonneault (2015)
	Action research	1 (2%)	Herterich et al. (2016)
Descriptive	Informed argument[4]	3 (5%)	Alrige and Chatterjee (2015), Domínguez, Pérez, Rubio, and Zapata (2019), Tilly, Posegga, Fischbach, and Schoder (2017)
	Illustrative scenario[5]	40 (73%)	Agogo and Hess (2018), Gimpel et al. (2018), Oberländer et al. (2018)
	Sorting[6]	2 (4%)	Küpper, Jung, Lehmkuhl, and Wieneke (2014), Werder and Wang (2016)
Question-based	Survey	4 (7%)	Siering et al. (2017), Snow and Reck (2016), Tönnissen and Teuteberg (2018)
	Focus group	3 (5%)	Cledou et al. (2018), Herterich et al. (2016), Holler et al. (2017)
	Expert interview[7]	5 (9%)	Addas and Pinsonneault (2015), Keller and König (2014), Terrenghi et al. (2018)

[3] Under the evaluation method "Field study" (taken from Prat et al. 2015), we subsume "Log diary" (taken from our coding of taxonomy-related evaluation methods, see Appendix 2).

[4] Under the evaluation method "informed argument" (taken from Prat et al. 2015), we subsume "Logical argument" (taken from our coding of taxonomy-related evaluation methods, see Appendix 2).

[5] Under the evaluation method "Illustrative scenario" (taken from Prat et al. 2015), we subsume "Illustrative scenario with real-world objects" and "Illustrative scenario with existing research" (taken from our coding of taxonomy-related evaluation methods, see Appendix 2).

[6] This evaluation method is not explicitly listed in Prat et al. (2015) and was classified by the authors of this study.

Table A7: Taxonomy-related evaluation criteria

DSR artefact types (March & Smith, 1995)	DSR evaluation criteria (March & Smith, 1995; Sonnenberg & vom Brocke, 2012)	Definition of DSR evaluation criteria (following Prat et al., 2015)	Frequency of taxonomy evaluation criterion in our sample	Example references
Construct & Model	Completeness[7]	The degree to which the structure of the artefact contains all necessary elements and relationships between elements.	31 (63%)	Gimpel et al. (2018), Oberländer et al. (2018), Tilly et al. (2017)
Construct	Ease of use	The degree to which the use of the artefact by individuals is free of effort	0	-
	Elegance	The elegance with which the artefact has been built	0	-
	Simplicity[8]	The degree to which the structure of the artefact contains the minimal number of elements and relationships between elements	21 (43%)	Gimpel et al. (2018), Oberländer et al. (2018), Weking, Hein, Böhm, and Krcmar (2018)
	Understandability	The degree to which the artefact can be comprehended, both at a global level and at the detailed level of the elements and relationships inside the artefact	6 (12%)	Addas and Pinsonneault (2015), Jöhnk et al. (2017), Oberländer et al. (2018)
Model	Fidelity with real world	The degree to which the structure of the artefact corresponds to the modeled reality	1 (2%)	Jöhnk et al. (2017)
	Consistency	The degree of uniformity, standardization, and freedom from contradiction among the elements of the structure of the artefact	2 (4%)	Barn and Barn (2016), Terrenghi et al. (2018)
	Level of detail	Results from the ratio of completeness and simplicity	0	-
	Robustness	The ability of the artefact to handle invalid inputs or stressful environmental conditions	20 (41%)	Gimpel et al. (2018), Oberländer et al. (2018), Püschel et al. (2016)

[7] Under the evaluation criterion "Completeness" (taken from Sonnenberg and vom Brocke (2012)), we subsume "Completeness" and "Comprehensiveness" (taken from our coding of taxonomy-related evaluation criteria, see Appendix 2).

[8] Under the evaluation criterion "Simplicity" (taken from Sonnenberg and vom Brocke (2012)), we subsume "Simplicity" and "Conciseness" (taken from our coding of taxonomy-related evaluation criteria, see Appendix 2).

Appendix 4: Evaluative expert interviews

We conducted semi-structured interviews with five taxonomy experts (Table A8) who provided feedback on the understandability and the expected usefulness of the ETDP and the TDR as well as detailed advice for their potential adjustment and refinement. Based on their experience and reflection of taxonomy design and publication processes in IS, the experts consistently agreed with the assessment of the ETDP and the TDR as highly relevant. Indeed, they themselves had encountered methodological questions when applying existing taxonomy development methods and/or lack of guidance on how to evaluate taxonomies. All taxonomy experts provided extensive and constructive feedback that was, afterwards, comprehensively and collaboratively reflected upon by the author team. As a result, we revised and extended the ETDP and TDR (Table A9).

Taxonomy experts for evaluation in semi-structured interviews

Table A8 provides an overview of the five taxonomy experts (who have published taxonomy articles in the AIS Senior Scholars' Basket of Eight) who provided their feedback on the ETDP and the TDR in semi-structured interviews. These interviews were conducted in November and December 2019 and typically lasted for around one hour.

Table A8: Overview of taxonomy experts for evaluation

Role of expert	Country of expert	Research focus of expert	Interview details
Professor	Australia	Corporate innovation (eco)systems, revenue resilience, process management	Nov 2019, ~1 hour, video conference
Professor	Germany	Computer science, business information systems	Dec 2019, ~1 hour, video conference
Postdoctoral researcher	Germany	Finance and information systems	Dec 2019, ~1 hour, video conference
Practitioner (graduated as PhD student)	Germany	Information systems, information economics	Dec 2019, ~1 hour, video conference
Professor	USA	Diffusion of mobile technology, taxonomic theory, database systems	Dec 2019, ~1.5 hours, physical meeting

Overview of taxonomy expert feedback and resulting changes

Table A9 provides an overview of the feedback the taxonomy experts provided throughout the semi-structured interviews and resulting changes.

Table A9: Taxonomy expert feedback and resulting changes

ID	Taxonomy expert feedback	Resulting changes (if applicable) / comments
1	Questions on the ETDP's initial steps and whether 'specify intended purpose(s)' and 'specify target user group(s)' need to be exchanged, as the purpose might depend on the target user group(s) who should therefore be specified first	Steps 'specify intended purpose(s)' and 'specify target user group(s)' were interchanged
2	General comments on how to avoid a 'yet-another-taxonomy' effect, i.e., uncontrolled proliferation of taxonomies covering the same phenomenon	Adaption of recommendation (1) that asks why 'a(nother) is the right approach to conceptualise a phenomenon'; also addressed in section 'Discussion and Conclusion'
3	Interviewees found definition of purpose(s) and evaluation goal(s) too vague	Potential purpose(s) and potential evaluation goal(s) were further specified and examples for the researchers' references are provided
4	Interviewee stated that 'a taxonomy is good/useful if it is actually used'	Perspective incorporated in description of taxonomy evaluation
5	Interviewee asked about differentiation between artificial and naturalistic evaluation of taxonomies	Reference to Venable et al.'s (2016) work included covering references to artificial and naturalistic evaluation of taxonomies
6	Concept of a meta-characteristic was still found to be difficult to understand and apply	Detailed explanation and illustration included
7	Does recommendation 10 (sources to identify objects) also refer to databases?	Databases as example included
8	How does Peffers et al.'s (2007) 'demonstration' activity relate to the testing of objective ending conditions?	Better explained in results section
9	Question on the association of the ETDP's initial steps to Peffers et al.'s (2007) activities	*Not addressed – could be clarified after detailed examination of Peffers et al.'s (2007) work and a follow-up discussion*
10	Question on potential method configuration (e.g., depending on purpose, context)	*Not addressed – subject to further research, mentioned in the section 'Discussion and Conclusion'*
11	Could process modelling language according to ISO norm DIN 66001 be applied	*Not addressed – following the modelling language applied in Nickerson et al.'s (2013) original method*
12	Is a connection required between the determination of evaluation goal(s) and the configuration of evaluation?	*Not addressed – could be misused to adapt evaluation goals (instead of the taxonomy) if evaluation does not support a taxonomy's usefulness*
13	Interviewees asked for demonstration of the ETDP and the TDR	*Not addressed – subject to further research (TDR are too broad and many to be demonstrated in one taxonomy project), mentioned in the section 'Discussion and Conclusion'*