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RESEARCH PAPER

Development and evaluation of a taxonomy for platform revenue models

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Abstract

A critical challenge in launching successful platform business models is the design of viable revenue models. While existing frameworks and taxonomies address platform business models more broadly, conceptual clarity regarding platform revenue models remains limited, particularly in terms of how value is captured among platform actors. The absence of a consistent taxonomy leaves dimensions and characteristics fragmented across studies, thereby constraining theory-building and limiting actionable guidance for managerial decisions on value-capture mechanisms and pricing strategies. This study proposes a taxonomy of platform revenue models comprising 15 dimensions and 64 characteristics. Following a taxonomy design methodology grounded in design science research, we apply iterative design cycles and principles. A controlled experiment is conducted to empirically assess the usefulness of the taxonomy. Our results show that the taxonomy significantly improves the completeness and accuracy of the designed platform revenue models. This research advances platform business model theory by offering an evaluated taxonomy that supports the conceptualization of platform revenue models.

Keywords Taxonomy evaluation · Taxonomy design · Design science research · Business model · Revenue model · Digital platform

JEL classification L86 · M15 · O3 · L10

Introduction

The platform economy has emerged as a transformative force (McAfee & Brynjolfsson, 2017; Parker et al., 2016), attracting scholarly interest from diverse fields seeking to examine the disruptive impact of platform businesses, such as Airbnb in hospitality (Zervas et al., 2017), Uber in mobility (Clarke, 2022; Eckert et al., 2024), or Spotify in the music industry (Fleischer, 2021; Vonderau, 2019). Platforms enhance trading efficiency by increasing transaction frequency and reducing search, replication, and verification costs (Xue et al., 2020), while their rapid growth, driven by network effects, often leads to market dominance through winner-take-it-all dynamics (Armstrong, 2006; Hagiu & Wright, 2015; Rochet & Tirole, 2003). To gain a deeper understanding of their role in shaping economic interactions, it is necessary to look beyond their technical infrastructure and examine their underlying business logic (Guggenberger et al., 2020; Täuscher & Laudien, 2018), which is conceptualized through a business model that describes how value is created, delivered, and captured (Teece, 2010). Unlike

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value chain or pipeline-oriented business models, which are characterized by traditional firm-customer value delivery, platform business models rely on peer-to-peer exchanges in which value is co-created within actor-to-actor networks, as exemplified by platforms such as Airbnb and Uber (Fehrer et al., 2018; Täuscher & Laudien, 2018; Wirtz et al., 2019). Platform business models transform not only value creation and delivery but also redefine value capture, as they employ revenue models, i.e., the mechanisms by which a firm generates revenue from its value creation (Osterwalder & Pigneur, 2013), that extract value across multiple market sides rather than from a single customer segment (Daxhammer et al., 2019; Kenney & Zysman, 2016; Täuscher & Laudien, 2018).

While prior research has offered broad insights into the value creation and delivery dimensions of platform business models (Fu et al., 2017; Rohn et al., 2021; Täuscher & Laudien, 2018), value capture remains underexplored (Fehrer et al., 2018; Hein et al., 2020). In platform contexts, designing revenue models is particularly challenging, as business model designers must make complex decisions about whom and what to charge to ensure scalability (Kim, 2016; Madanaguli et al., 2023; Pidun et al., 2020). Flawed revenue model design is a central factor in platform failure, particularly due to inadequate surplus sharing and insufficient protection of monetization opportunities (Mancha & Gordon, 2022; Parker et al., 2016). Accordingly, information systems (IS) researchers have emphasized the importance of gaining deeper insights into the value capture and revenue model design of digital platforms (cf. Hein et al., 2020; Madanaguli et al., 2023; Veile et al., 2022). This study contributes to this call by proposing a taxonomy that structures platform revenue models and supports business model designers in developing viable revenue model strategies. It is guided by the following two questions.

- RQ1: Which dimensions and characteristics constitute a taxonomy for describing platform revenue models?
- RQ2: How useful is a developed taxonomy in supporting the design of platform revenue models?

This study follows the taxonomy design methodology of Kundisch et al. (2022) within a design science research (Hevner & Chatterjee, 2010) context. As a first step toward addressing RQ1, we synthesize existing research on platform revenue models and incorporate insights from the analysis of seven platform cases. To answer RQ2, we conduct a controlled experiment with ten practitioners, equally divided into test and control groups, to evaluate the taxonomy's usefulness in designing platform revenue models. Expert reviewers assessed the resulting descriptions in terms of completeness (i.e., coverage of relevant components) and accuracy (i.e., clarity, structure, and logical coherence), allowing for a measurable comparison of outcomes.

The contribution of this study is twofold. The first contribution is a taxonomy of platform revenue models, comprising 15 dimensions and 64 characteristics. The taxonomy distinguishes between two perspectives that together form a comprehensive logic of a platform revenue model: the platform operator, with eight dimensions, and the supply-side actors, who offer products and services via the platform, with seven dimensions. By enabling a differentiated perspective on revenue model design across platform actors, this taxonomy contributes to addressing a key unresolved issue in platform research—namely, how value is captured between platform owners and supply-side actors (Hein et al., 2020; Helfat & Raubitschek, 2018). The usefulness of the proposed taxonomy is evaluated in a controlled experiment, which shows that participants applying it designed more comprehensive and accurate models than those in the control group.

The second contribution results from applying the taxonomy to seven platform cases during its development. This application identified 26 distinct revenue model types and illustrates the simultaneous use of multiple revenue strategies within the observed cases. Our results extend prior research on classified platform business models (Staub et al., 2021; Täuscher & Laudien, 2018) and underscore the need for a deeper understanding of how different revenue model types can be combined within a single platform business model.

Building on these contributions, we offer practitioners a structured framework for designing their own platform revenue models. For researchers, the taxonomy provides a foundation for developing ex post theories (Bapna et al., 2004) and fostering a deeper understanding of platform revenue model design.

Theoretical context

Platforms can be analyzed from a market-oriented, sociotechnical, technical, or business-oriented perspective (Hein et al., 2020; Täuscher & Laudien, 2018). This study takes a business-oriented perspective, focusing on the business model aspects of digital platforms.

Platform business models

Interest in business models is growing in the field of IS, leading to a rich body of definitions and perspectives on the concept (Massa et al., 2017; Möller et al., 2022; Zott et al., 2011). The conceptualizations proposed by Teece (2010) and Osterwalder and Pigneur (2010) are widely recognized and have become foundational references (Amit & Zott, 2020; Massa et al., 2017). In this study, we follow the definition of Teece (2010), who describes a business model as "the design or architecture of the value creation, delivery, and capture mechanisms" employed. Similar to the broader concept of a business model, the term platform business model lacks a widely accepted definition and is often used interchangeably with related terms such as "multi-sided platforms", "multi-sided markets", "platform-based markets", and "platform ecosystems" (Fehrer et al., 2018). A platform business model reduces transaction costs by providing an infrastructure through which multiple transactions can take place efficiently (Fehrer et al., 2018; Rohn et al., 2021). Traditional business models rely on a centralized exchange of value by managing a linear series of activities from input to output, resembling a pipeline or value chain (Wirtz et al., 2019). In contrast, platform business models create value by facilitating interactions between different stakeholders through a digital platform, creating a value network and often resulting in co-created value (Ceccagnoli et al., 2012; Smedlund et al., 2018; R. Wieringa & Gordijn, 2023).

This study examines platform business models that rely on digital infrastructures to enable transaction-based value creation, commonly referred to as "transaction platforms" (Cusumano et al., 2019; Evans & Gawer, 2016). In contrast to innovation platforms that provide a technological foundation for complementary innovations (Cusumano et al., 2019), transaction platforms create value by facilitating interactions between distinct participants engaged in the exchange of assets (Dushnitsky et al., 2022; Koch et al., 2022). In this context, an "asset" can be defined as any good—material or immaterial, such as products, services, or data—that is considered valuable by both providers and consumers (Koch et al., 2022). Such transactions typically involve collaboration between providers and consumers mediated by a platform operator who does not own these assets themselves (Hein et al., 2020; Koch et al., 2022; Subramaniam et al., 2019).

Acknowledging the varying terminologies in the literature (Beverungen et al., 2021; Hein et al., 2020; Parker et al., 2016), we adopt the framework proposed by Koch et al. (2022) to describe the triadic relationship in which a digital platform facilitates brokering activities performed by an asset broker (platform operator) to match asset providers (organizations or individuals offering information, goods, or services) with asset consumers (organizations or individuals consuming those offerings).

Platform revenue models

We define a platform revenue model as an economic concept within the value-capture dimension of a business model, specifying the monetization mechanisms through which a digital platform generates revenue from its intermediation activities between market sides (Kim, 2016; Osterwalder, 2004; Täuscher & Laudien, 2018). It highlights the mechanisms by which value is captured by the platform, often through subscription fees, transaction fees, or advertising revenue (Täuscher & Laudien, 2018), using monetization mechanisms that preserve and enhance rather than undermine network effects (Parker et al., 2016). Network effects and their creation are particularly important for platforms (Kim, 2016; Trischler & Meier, 2021) as illustrated in Fig. 1.

Prior research has extensively shown that platform pricing and revenue model design play a key role in fostering direct and indirect network effects (Caillaud & Jullien, 2003; Hagiu, 2006; Parker & van Alstyne, 2005; Rochet & Tirole, 2003). In the case of direct network effects, the value to each user increases as the number of users on the

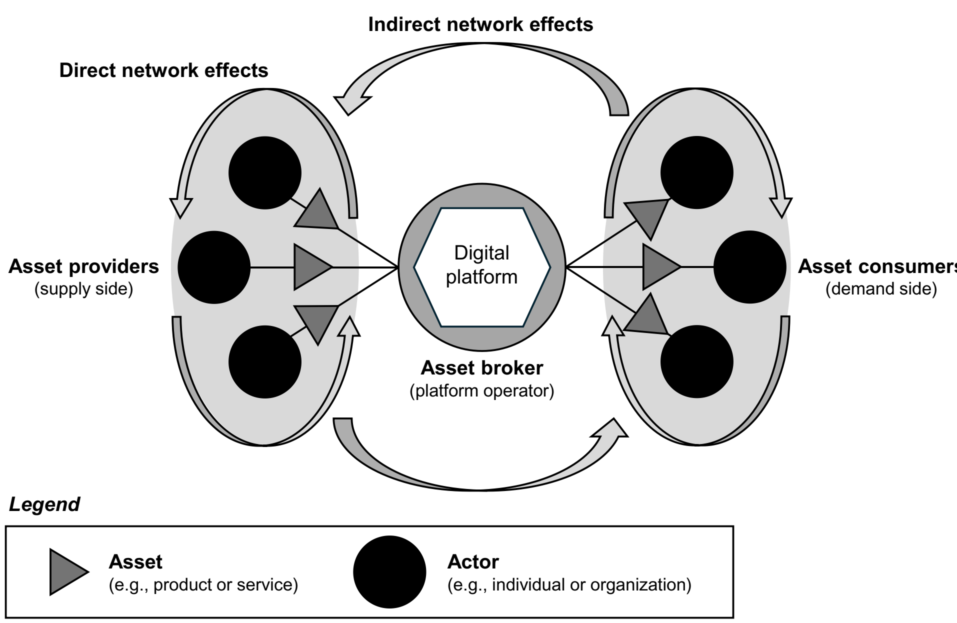
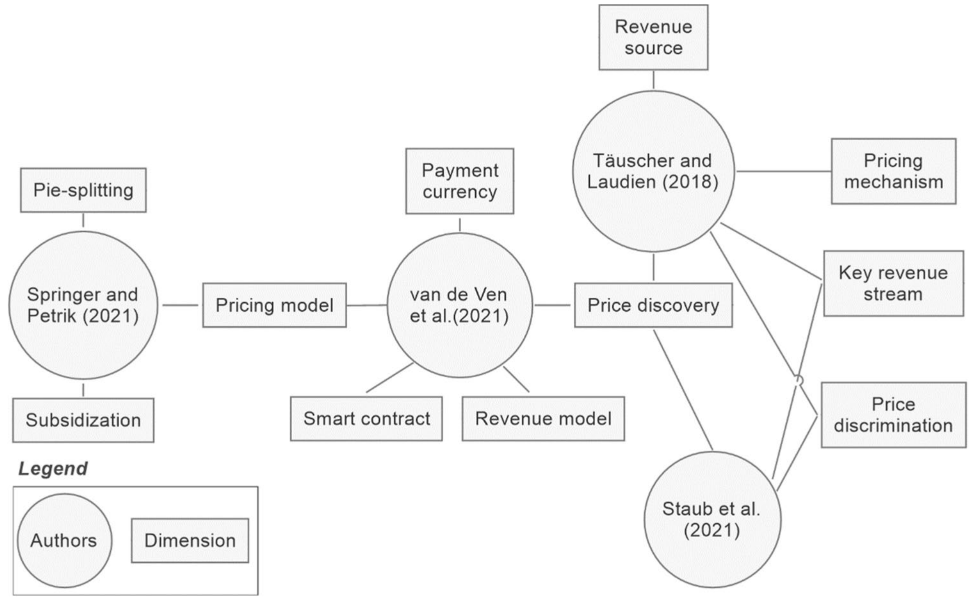


Fig. 1 Illustrated interaction between platform actors, brokered assets, and network effects

Fig. 2 Concept map of selected platform revenue model dimensions



same side of the market increases. Indirect network effects occur when the value of users on one side of the market increases as the size of the opposite side of the market increases. These externalities influence user behavior and are a driver of platform scalability (Cusumano, 2015; Katz & Shapiro, 1994; Sorri et al., 2019; Tussyadiah & Pesonen, 2016).

The literature increasingly emphasizes the importance of choosing which side of the market to serve as a revenue source within a platform revenue model (Eisenmann et al., 2006; Kim, 2016; Omarini, 2017; Wirtz et al., 2019). According to Eisenmann et al. (2006), platform operators need to consider the price sensitivity of each market side to determine the money and the subsidy side. Participants on the money side, who pay for platform services, usually exhibit low price sensitivity, whereas the subsidy side is more price sensitive (Omarini, 2017). Platforms (e.g., app stores) subsidize the side with higher demand elasticity (e.g., users) to attract participation, while charging the money side (e.g., developers) (Kim, 2016; Rochet & Tirole, 2003). While some platform operators subsidize one or more market sides, others may charge a single price for all market sides, differentiate between market sides, or even vary fees within a market side (Daxhammer et al., 2019).

Taxonomies for platform revenue models

A taxonomy classifies concepts or objects, aiding structured insights and comprehension of complex domains. It provides researchers with a means to analyze, structure, and understand complex domains (Nickerson et al., 2013). The IS community has proposed various taxonomies for business models and digital platforms, as exemplified in the works of Bergman et al. (2022), Duparc et al. (2022), Lage et al. (2022), Möller et al. (2022), Tessmann and Elbert (2022), and Weking et al. (2020a). The literature on platform business models has also identified a variety of dimensions for value capture, reflecting both general principles and context-specific nuances, as exemplified by selected studies shown in the concept map in Fig. 2. The studies included in the concept map were selected for their relevance to platform revenue models and their scholarly visibility (each cited more than ten times). The selection is not comprehensive but serves to highlight the fragmentation of research on platform revenue models and should be understood as illustrative rather than exhaustive. Existing frameworks emphasize common dimensions such as key revenue streams, price discrimination (Staub et al., 2021; Täuscher & Laudien, 2018), price discovery (Staub et al., 2021; Täuscher & Laudien, 2018; van de Ven et al., 2021), and pricing models (Springer & Petrik, 2021; van de Ven et al., 2021). Sector-specific dimensions, such as pie-splitting in industrial platforms (Springer & Petrik, 2021) and smart contracts in data marketplaces (van de Ven et al., 2021), underscore the adaptability of value-capture strategies to different sectors.

A taxonomy incorporating the value-capture perspectives of asset brokers and providers could enable a more nuanced and structured approach to platform revenue model design (Fehrer et al., 2018; Hein et al., 2020; Helfat & Raubitschek, 2018).

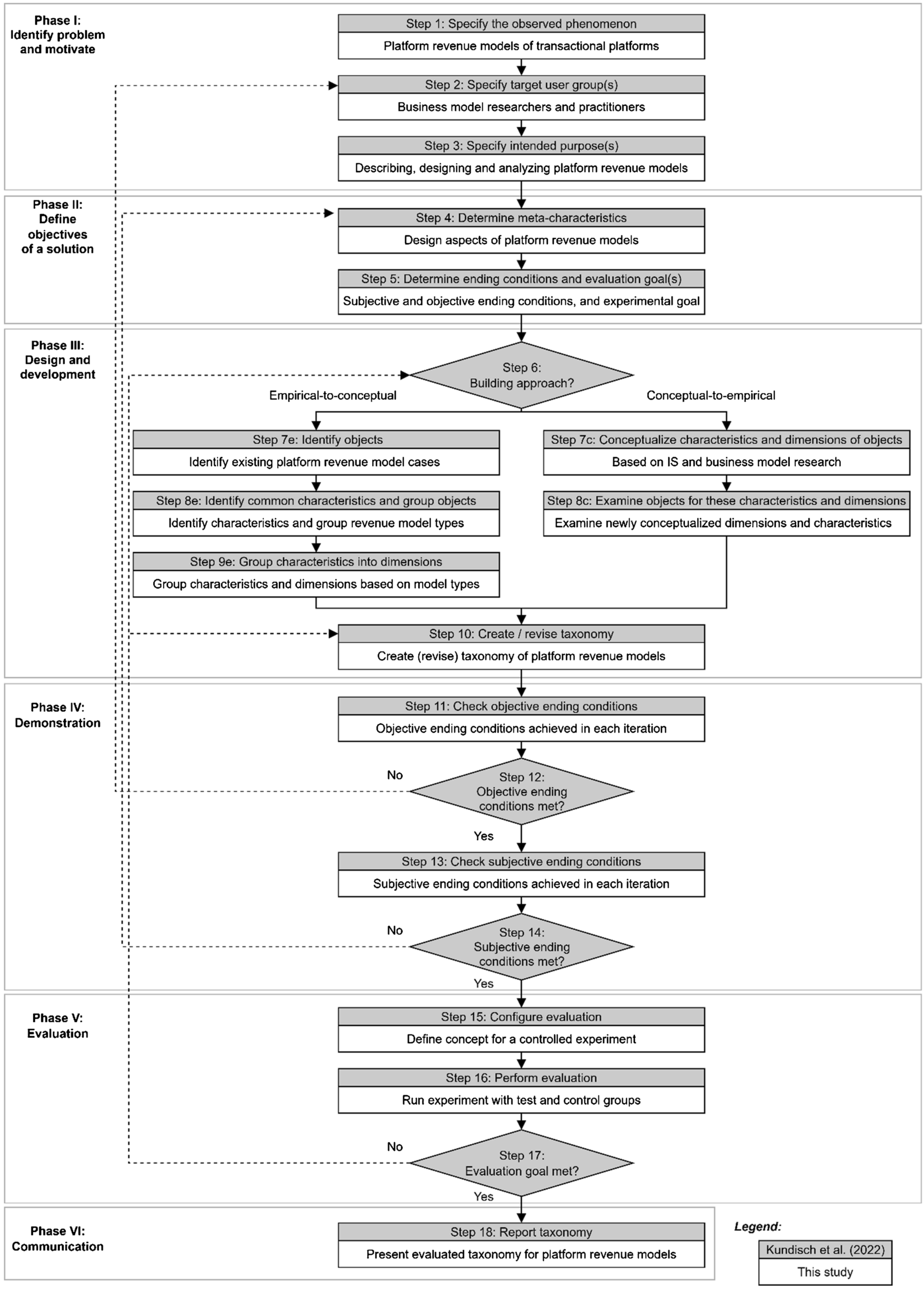


Fig. 3 Applied ETDP research design

Extended taxonomy design process

Our research approach follows the extended taxonomy design process (ETDP) with six phases[1] as proposed by Kundisch et al. (2022) and is illustrated in Fig. 3. Kundisch et al. (2022) extend the original taxonomy development process introduced by Nickerson et al. (2013) by emphasizing ex-post evaluation, which assesses the usefulness of a taxonomy after its development. In addition to the applied ETDP approach, the 26 taxonomy design recommendations (TDRs) outlined by Kundisch et al. (2022) were also applied. These recommendations provide researchers with design guidelines for each of the six ETDP phases and are systematically referenced in the corresponding steps of this study (see steps 1–18 in Fig. 3) and are presented in ESM1 -Supplement A.

Phase I: Identify problem and motivate

Step 1: Observed phenomenon

The phenomenon under consideration is the dimensions and characteristics specific to revenue models of transactional platforms that are critical to understanding the value-capture aspect of platform business models (TDR 1). While existing taxonomies and frameworks broadly address platform business models (Täuscher & Laudien, 2018), there is still limited conceptual clarity regarding revenue model design, particularly concerning how value is captured between platform actors (Hein et al., 2020; Helfat & Raubitschek, 2018).

Steps 2 and 3: Target user groups and intended purposes

The primary purpose of this taxonomy is to support researchers and practitioners, including managers, business analysts, and digital innovation designers (TDR 3), by providing a framework for describing, designing and analyzing platform revenue models (TDR 2).

Phase II: Define objectives of a solution

Step 4: Determine meta-characteristics

The design aspects of platform revenue models are established as the meta-characteristic, providing a structured basis for identifying and categorizing the key dimensions and characteristics of platform revenue models (TDR 4). The choice of this meta-characteristic is driven by the need for a more precise understanding of platform revenue models. Our meta-characteristic includes, for example, the configuration of revenue sources and streams—specifically, whether an asset broker generates revenue from asset consumers through transaction fees, subscriptions, or other mechanisms—and how asset providers monetize their offerings through the platform. During the development of the taxonomy, no changes were made to this meta-characteristic (TDR 5).

Step 5: Determine ending conditions and evaluation goal

The ending conditions are divided into objective criteria: generalizable, inclusive, conclusive, unique, and subjective criteria: concise, robust, comprehensive, extendible, explanatory (Nickerson et al., 2013). All conditions are described in Table 5 of phase IV. Beyond these conditions, TDR 6 also emphasizes the importance of anticipating an evaluation objective, which is defined in step 15.

Phase III: Design and development

The development of the taxonomy followed an iterative approach, comprising two conceptual-to-empirical (C2E) and two empirical-to-conceptual (E2C) iterations, in line with TDR 9, which requires at least one of each (Kundisch et al., 2022). Detailed information about the two C2E iterations and the literature review is provided in Bartels et al. (2023), while the two E2C iterations are detailed in Bartels et al. (2024).

Step 6: Building approach?

Motivated by TDR 7, we began the process with two C2E iterations to build a theoretical foundation, as sufficient insights were available from the literature. Once the conceptual structure was in place, the development continued with two E2C iterations, in line with TDR 8, to incorporate empirical insights from seven case studies.

Steps 7c-10: Conceptual-to-empirical iterations

(7c) conceptualize characteristics and dimensions of objects

To ensure robust C2E iterations (TDR 10), a literature review, as detailed in ESM4, is conducted across the fields of IS and Business Management. Inclusion was based on whether the paper contributes to the conceptualization of

[1] Whereas the original ETDP distinguishes between objective ending conditions in phase IV and subjective ones in phase V (Kundisch et al; 2022), this study presents all ending conditions collectively in phase IV.

platform revenue models by addressing their dimensions or characteristics (e.g., revenue strategies, pricing logic). A total of 930 papers were retrieved using the search term: (ecosystem OR platform) AND (business model OR value-capture OR revenue model OR profit model). These papers were sourced from six databases: Scopus (259), Web of Science (149), IEEE Xplore (23), ACM (11), Google Scholar (133), and Dimensions (355). As an additional step, five papers were manually included based on their conceptual relevance to platform revenue models, which were not fully captured by the initial search: Derave et al. (2022), Freichel, Fieger, and Winkelmann (2021), Springer and Petrik (2021), van de Ven et al. (2021), and Weking et al., (2020b). As shown in Fig. 4, from a total of 935 papers, 34 papers are selected as relevant, with 68 dimensions and 258 characteristics extracted.

The remaining 901 papers were excluded based on the following criteria: 204 were duplicates (EC1), 30 were not written in English (EC2), six were less than three pages (EC3), typically abstracts or summaries lacking sufficient depth for analysis, 13 were not research papers (EC4) as they lacked a clear methodology, 41 were not accessible (EC5) even after contacting the authors, and 607 did not meet the inclusion criteria (EC6) for extracting dimensions and characteristics for platform revenue models.

The review of the 34 papers revealed 68 dimensions and 258 characteristics relevant to platform revenue models. To synthesize these data, a concept matrix was developed following Webster and Watson (2002). The definitions provided by the authors in the analyzed papers were extracted and documented in Excel. Nine dimensions were unclassifiable and therefore labeled "n/a".

The remaining 59 dimensions were sorted and categorized based on identified commonalities and then discussed among three authors, resulting in eight self-coded dimensions as shown in Table 1. The full coding procedure is documented in ESM4.

Each study is categorized based on whether it presents a classification (e.g., a taxonomy) and its alignment with TDR 11, which emphasizes the importance of referencing existing

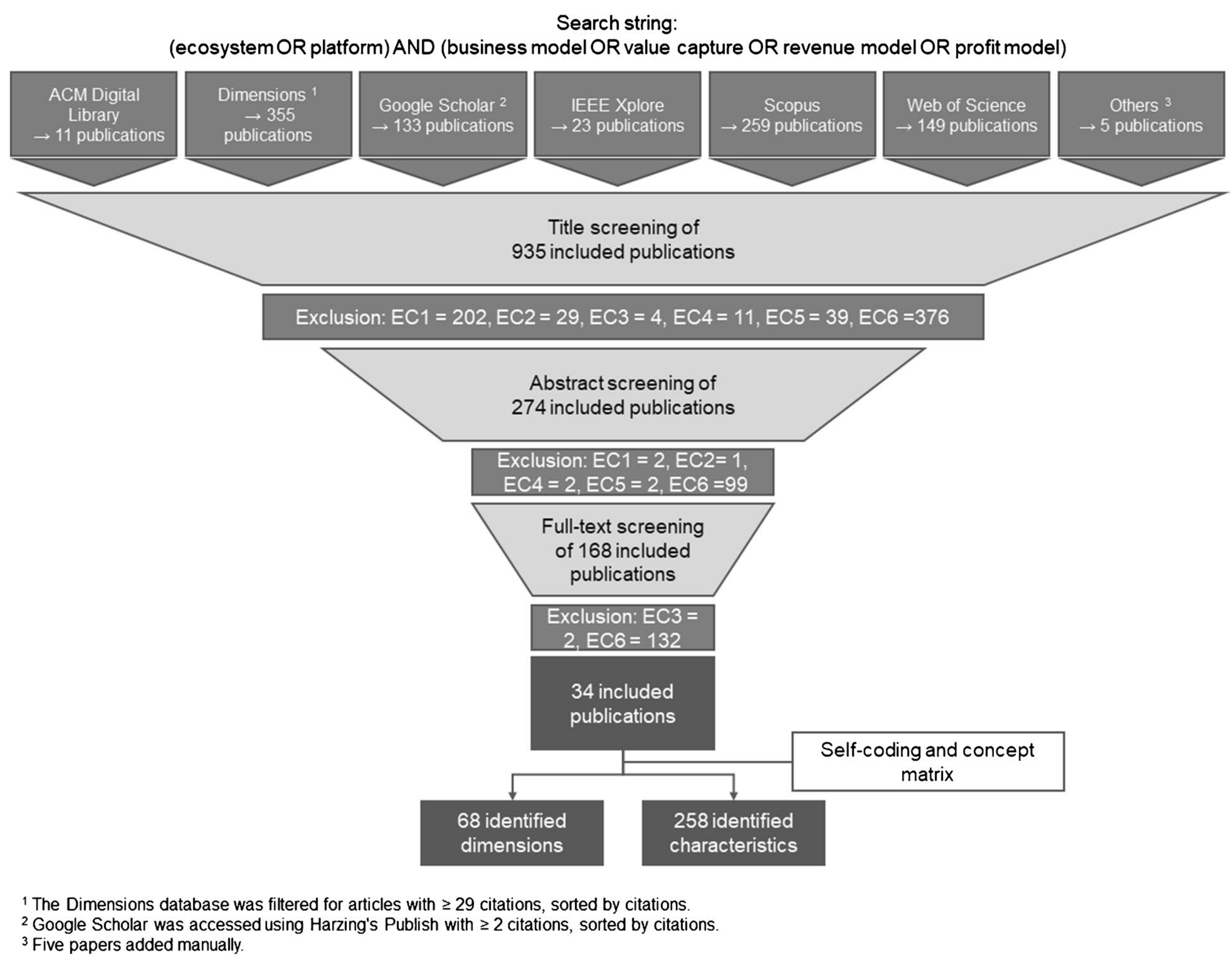


Fig. 4 Summary of the search results

Table 1 Concept matrix of the 34 articles identified

No	Authors	Classification provided (e.g., taxonomy)?	Revenue model	Revenue stream	Revenue source	Payment frequency	Pricing model	Price mecha- nism	Price dis- covery	Price dis- crimination
1	Curtis and Mont (2020)	Yes		x	x			x		x
2	Derave et al. (2022)	Yes		x	x	x			x	x
3	El Sawy and Pereira (2013)	Yes	x				x			
4	Enders et al. (2008)	No	x							
5	Freichel, Hofmann, et al. (2021)	Yes		x	x					
6	Freichel, Fieger, and Winkelmann (2021)	Yes	x	x	x			x		
7*	Ghezzi (2012)	No								
8	Giessmann et al. (2014)	Yes		x						
9*	Helfat and Raubitschek (2018)	No								
10*	Hoyer and Stanoevska-Slabeva (2009)	No								
11	Hyrynsalmi et al. (2012)	No	x							
12	Immonen et al. (2014)	No					x			
13	Janssen and Zuiderwijk (2014)	No	x							
14	Kim (2016)	No			x					
15	Kohler (2015)	No		x						
16	Kübel and Zarnekow (2014)	Yes			x	x				
17	Laczko et al. (2019)	No	x							
18	Lin et al. (2020)	No	x							
19	Mancha and Gordon (2022)	No					x			
20	Park et al. (2021)	No					x			
21	Rohn et al. (2021)	Yes		x	x		x	x		
22	Ruggieri et al. (2018)	No		x						
23*	Schreieck et al. (2017)	No								
24	Springer and Petrik (2021)	Yes			x	x				
25	Staub et al. (2021)	Yes		x					x	x
26	Still et al. (2017)	Yes	x							
27	Täuscher and Laudien (2017)	Yes		x	x			x	x	x
28	Täuscher and Laudien (2018)	Yes		x	x			x	x	x
29*	Teece and Linden (2017)	No								
30*	Teece (2010)	No								
31	van de Ven et al. (2021)	Yes	x				x		x	
32*	Verstegen and Doorneweert (2017)	No								
33	Weking et al. (2020a)	No		x			x			
34	Weking et al., (2020b)	Yes	x		x	x	x			
	Sum		**10**	**12**	**11**	**4**	**8**	**5**	**5**	**5**

*Note: Studies without coding entries could not be unambiguously assigned to any dimension

Table 2 Characteristics of selected platform cases

Platform	Description	Sector	Business context	Brokered asset
Tyre24	Platform connecting suppliers of car parts with car repair shops	Automotive	B2B	Car parts
empto	Platform connecting waste disposers with companies producing waste	Waste management	B2B	Waste disposal services
MyHammer	Platform connecting skilled trade businesses with home-owners	Skilled trades	B2C	Craft services
Vinted	Platform connecting private sellers of clothing with buyers	Secondhand fashion	C2C	Clothing items
nebenan.de	Platform connecting neighbors, local businesses, and organizations	Community/social	C2C, B2C & B2B	Local goods and information

taxonomies to inform taxonomy development. While "revenue model" (10 studies), "revenue stream" (12), and "revenue source" (11) are frequently discussed, "payment frequency" appears in only four studies. Moderate attention is given to "pricing model" (8), while "price mechanism", "price discovery", and "price discrimination" are covered in five studies each, suggesting a limited focus on pricing structures.

(8c) examine objects for these characteristics and dimensions

Kundisch et al. (2022) emphasize the importance of examining use cases to evaluate newly conceptualized dimensions and characteristics (TDR 12). In this evaluation, step 8c within a C2E iteration tests the applicability of predefined dimensions in real-world scenarios. Accordingly, the derived taxonomy was tested against the Smarte.Land.Regionen (SLR) case, which focuses on improving public services in rural areas through digital solutions and is introduced in ESM1-Supplement B. The resulting taxonomy, outlined in ESM1-Supplement C, served as the basis for subsequent E2C iterations.

Steps 7e-10: Empirical-to-conceptual iterations

(7e) identify objects

TDR 13 highlights the importance of using multiple sources to identify objects for E2C iterations. In the first E2C iteration, five platform business models are systematically analyzed: beginning with Tyre24,[2] followed by empto,[3] MyHammer,[4] Vinted,[5] and nebenan.de.[6] As shown in Table 2, a representative set of platform cases is drawn from Koch et al. (2023) to ensure coverage of different sectors (e.g., automotive), business contexts (e.g., B2C), and brokered assets (e.g., physical products).

To ensure suitability for the taxonomy application, the cases must meet three criteria: (1) a clearly identifiable two-sided market structure, (2) sufficient transparency regarding the revenue model, and (3) limited complexity in interdependence with adjacent business models.

To assess the completeness and accuracy of the taxonomy in the second E2C iteration, two additional projects focusing on digital platforms were selected as case studies: Smarte.Land.Regionen (SLR) and Machine Sharing Platform (MSP). The SLR platform revenue model is initially tested in the second C2E iteration. As the project evolves, however, additional revenue models emerge. The revenue model descriptions for both platform cases are based on internal project documents provided by Fraunhofer IESE. A detailed description of all seven case studies, including their revenue models, is provided in ESM1-Supplement B.

(8e) identify common characteristics and group objects

Both qualitative and quantitative methods are used to systematically identify characteristics and group them into dimensions (TDR 14). Qualitatively, each case study is mapped against the taxonomy derived from the literature to align and select relevant characteristics. Quantitatively, descriptive statistics were used to analyze how often certain characteristics occur across the examined cases. The aggregated results of this analysis in ESM5 are summarized in Table 3.

Five of the seven platform business models examined (71%) use commission fees (Tyre24, empto, MyHammer, Vinted, and MSP), which is consistent with the finding of Täuscher and Laudien (2018) (72%). However, of the 26 types of revenue models identified across the seven platform business models studied, commissions account

[2] Link to the homepage of Tyre24: https://tyre24.alzura.com/

[3] Link to the homepage of empto: https://www.empto.de/

[4] Link to the homepage of MyHammer: https://www.my-hammer.de/

[5] Link to the homepage of Vinted: https://www.vinted.de/

[6] Link to the homepage of nebenan.de: https://nebenan.de/

for only 27%, highlighting the frequent use of multiple revenue models simultaneously, such as combining a commission model with an access model (e.g., Tyre24). Vinted uses the most types of revenue models (six), followed by Tyre24 and nebenan.de (five each).

(9e) group characteristics into dimensions

The literature reveals two distinct perspectives on monetization, particularly with respect to pricing dimensions. Some authors focus on the pricing mechanisms employed by platform operators, such as fixed access fees or transaction fees (Mancha & Gordon, 2022; Rohn et al., 2021), including variations in fees across discriminatory factors (Gibbs et al., 2018; Tremblay, 2020). In contrast, other authors examine the pricing mechanisms for asset providers, focusing on how and by whom the prices of products, services, etc., offered on the platform are determined (Curtis & Mont, 2020; Täuscher & Laudien, 2018). The empirically tested characteristics were grouped into dimensions derived from the literature and categorized into asset broker dimensions (DB) and asset provider dimensions (DP) to reflect both perspectives, as shown in Table 4.

(10) create/revise taxonomy

The development process resulted in a stable version with 15 dimensions and 64 characteristics, as shown in Fig. 7, with all “other” options removed from Table 4. The percentages of empirical appearance presented in the following are based on the 26 identified platform revenue model types.

Asset broker perspective. The revenue model type (DB1), which specifies the value capture approach (El Sawy & Pereira, 2013; Freichel, Fieger, & Winkelmann, 2021; Lin et al., 2020; van de Ven et al., 2021), the revenue stream (DB2), which describes the specific monetization strategy employed (Derave et al., 2022; Freichel, Fieger, & Winkelmann, 2021; Täuscher & Laudien, 2018; Weking et al., 2020a), and the revenue source (DB3), which identifies which actors are monetized by the asset broker (Curtis & Mont, 2020; Kim, 2016; Täuscher & Laudien, 2018; Weking et al., 2020b), can be derived directly from the literature and existing taxonomies. Empirical findings support these

Table 3 Analyzed platform revenue model types

No	Platform	Who pays?	How is it monetized?	How much is monetized?
1	Tyre24	Consumers	Access fees to participate	€ 29 or € 69 monthly
2	Tyre24	Consumers	Commission fees	3.9% or 1.9% per transaction
3	Tyre24	Consumers	Access fees to service	Free or € 99 monthly
4	Tyre24	Providers	Access fees to service	Free or € 99 monthly
5	Tyre24	Providers	Commission fees	Free or 0.9% per transaction
6	empto	Providers	Commission fees	4% per transaction
7	empto	Consumers	Commission fees	4% per transaction
8	MyHammer	Providers	Commission fees	€ 1–89 per user contact
9	Vinted	Consumers	Commission fees	5% per transaction
10	Vinted	Consumers	Protection service	€ 0.7 per transaction
11	Vinted	Consumers	Verification service	€ 25 per item
12	Vinted	Providers	Item visibility service	On demand
13	Vinted	Providers	Best matches service	€ 6.95 per item per week
14	Vinted	Third party	Fees for advertising space	On demand
15	nebenan.de	Consumers	Donations for platform	Pay what you want
16	nebenan.de	Providers (for-profit organizations)	Access fees to participate	€ 12, € 19, or € 49 monthly
17	nebenan.de	Providers (nonprofit organizations)	Access fees to participate	€ 10, € 18, or € 50 monthly
18	nebenan.de	Third party	Sponsorship with platform	On demand
19	nebenan.de	Third party	Fees for advertising space	On demand
20	SLR	Consumers	Access fees to participate	€ 500 one-time
21	SLR	Consumers	Access fees to participate	€ 140 monthly
22	SLR	Providers	Listing fees for assets	€ 1.000 one-time
23	SLR	Providers	Listing fees for assets	€ 250 monthly
24	MSP	Consumers	Access fees to participate	€ 5250 one-time
25	MSP	Providers	Access fees to participate	€ 5250 one-time
26	MSP	Providers	Commission fees	23% per transaction

dimensions, highlighting "commission fees" (27%) and "access fees for platform participation" (23%) as dominant revenue streams and "asset providers" (46%) as the primary monetized actors.

The payment trigger (DB4) is not explicitly detailed in existing taxonomies but is conceptually addressed in discussions of pay-per-use models (Mishra & Tripathi, 2020) and freemium pricing strategies (Frohmann, 2023). Empirical evidence identifies "pay per platform service use" (35%) and "pay per asset transaction" (27%) as common triggers. The payment frequency (DB5), which describes how often payments are made to the platform, is addressed by Derave et al. (2022), Springer and Petrik (2021), and Weking et al., (2020b). Empirically, "pay once" (58%) is the most prevalent characteristic.

Rohn et al. (2021), building on Armstrong (2006), van de Ven et al. (2021), and Mancha and Gordon (2022), discuss the price setting of the platform price, which is defined as price discovery (DB6). This dimension is distinct from asset pricing (see DP5) as it relates to platform fees. Empirically, platform prices are predominantly "set by the asset broker" (88%) or "set by negotiation" (8%), highlighting the centralized control asset brokers typically have over platform pricing.

The pricing mechanism (DB7) refers to how platform fees are structured, either as fixed absolute values or as percentage-based fees, a topic discussed in the literature (Edelman & Wright, 2014; Wang & Wright, 2024). On Amazon Marketplace, for example, sellers typically pay a percentage of their sales, with some categories having additional fixed per-unit fees (Gomes & Mantovani, 2024). Empirically, absolute fees (58%) are more common than percentage-based fees (23%).

The price discrimination (DB8) refers to whether platforms adjust prices for different participants (Staub et al., 2021). Tremblay (2020) illustrates this with different commission fees, such as 8% for electronics, 45% for Amazon device accessories, and 15% for kitchen appliances. Similarly, Gibbs et al. (2018) highlight Uber's dynamic pricing, where both asset prices and platform fees vary with demand. Empirically, "no price discrimination" is the most common (58%), while differentiation by "type of asset" (4%) or "type of user" (8%) is less common.

Asset provider perspective. The revenue model type (DP1) defines how asset providers earn revenue (Weking et al., 2020b). Derave et al. (2022) illustrate this with the ride-sharing platform BlaBlaCar, where the platform price includes booking fees, while trip payments are made to riders as part of the asset provider's revenue model. Empirically, the "sales model" (75%) dominates, while "rental models" are absent in the case studies examined.

The revenue stream (DP2) clarifies the monetization strategy of the asset providers. Gibbs et al. (2018) analyze this through different pricing strategies of Airbnb hosts, while Weking et al. (2020b) address the question "what does the customer pay for?" in their Industry 4.0 taxonomy, linking it directly to sales models. Empirically, "asset sales" (75%) dominate, highlighting direct sales. The revenue source (DP3) identifies where revenue originates (Curtis & Mont, 2020), and empirically, "asset consumers" (88%) account for the majority of revenue, with "asset brokers" (13%) contributing less.

The payment frequency (DP4), which is related to revenue-sharing (Kübel & Zarnekow, 2014; Weking et al., 2020a), indicates how often payments are made to asset providers for the use, sale, or lease of assets (Weking et al., 2020a). Empirically, "pay once" (63%) dominates, while "pay per asset subscription" (13%), "pay per asset use" (13%), and "pay whenever you want" (13%) are less common.

The price discovery (DP5) identifies who sets the asset price—asset broker, provider, consumer, or negotiation (Derave et al., 2022; Staub et al., 2021; Täuscher & Laudien, 2018; van de Ven et al., 2021). Pricemechanism (DP6) distinguishes between fixed and variable pricing strategies (Curtis & Mont, 2020; Freichel, Fieger, & Winkelmann, 2021; Rohn et al., 2021; Täuscher & Laudien, 2018). Price discrimination (DP7) considers whether prices vary by factors such as user type or location (Curtis & Mont, 2020; Derave et al., 2022; Täuscher & Laudien, 2018). Empirically, asset prices are mainly "set by asset providers" (75%), with "fixed pricing" (63%) being the most common, and price discrimination is rarely used, with "no price discrimination" (88%).

Documented changes throughout the development process. The final taxonomy, along with its dimensions and characteristics, as presented in Fig. 7, reflects 34 changes made during two E2C iterations. TDR 16 focuses on refining taxonomies through systematic operations and includes duplicating, extending, splitting, merging, replacing, or deleting characteristics and dimensions to ensure clarity. All changes and taxonomic developments are documented in ESM1-Supplement C.

Phase IV: Demonstration

The taxonomy ensures that all characteristics are mutually exclusive and collectively exhaustive (TDR 18). Mutual exclusivity is essential to maintain analytical clarity: while a platform may monetize multiple market sides (e.g., asset consumers and providers via access-based models), each configuration constitutes a separate revenue model type. This distinction is necessary, as dimensions like price mechanisms may differ by side. Conceptualization in the

Table 4 Conceptual taxonomy structure and empirical appearance for platform revenue model elements

Dimensions of asset broker DB and asset provider DP		Characteristics with empirical appearance	Conceptual base
DB1	Asset broker's revenue model type	DB1 = {access model (35%), listing model (8%), advertising model (8%), commission model (27%), sales model (15%), donation and sponsorship model (8%)}	Freichel et al. (2021); van de Ven et al. (2021); Lin et al. (2020); El Sawy and Pereira (2013)
DB2	Asset broker's revenue stream	DB2 = {access fees for platform participation (23%), access fees for platform features (12%), listing fees on platform (8%), advertising fees for space (8%), commission fees (27%), sales model of platform services (15%), donations or sponsorships (8%)}	Derave et al. (2022); Freichel, Fieger, and Winkelmann (2021); Weking et al. (2020a); Täuscher and Laudien (2018)
DB3	Asset broker's revenue source	DB3 = {asset consumers (42%), asset providers (46%), third party (12%)}	Curtis and Mont (2020); Weking et al., (2020a, 2020b); Täuscher and Laudien (2018); Kim (2016)
DB4	Payment trigger of the platform price	DB4 = {pay per platform access (23%), pay per asset listing (8%), pay per user–related contact data (4%), pay per asset transaction (27%), pay per platform service use (35%), pay whenever you want (4%)}	Frohmann (2023); Mishra and Tripathi (2020)
DB5	Payment frequency of the platform price	DB5 = {pay once (58%), pay on a recurring basis (35%), other (8%)}	Derave et al. (2022); Springer and Petrik (2021); Weking et al., (2020a)
DB6	Price discovery of the platform price	DB6 = {platform price set by asset broker (88%), platform price set by asset providers (0%), platform price set by asset consumers (4%), platform price set by negotiation (8%)}	Mancha and Gordon (2022); Rohn et al. (2021); van de Ven et al. (2021); Armstrong (2006)
DB7	Price mechanism of the platform price	DB7 = {absolute value (58%), percentage value (23%), variable (negotiated) value (15%), pay what you want (4%)}	Gomes and Mantovani (2024); Wang and Wright (2024); Edelman and Wright (2014)
DB8	Price discrimination of the platform price	DB8 = {type of asset (4%), type of user (8%), quantity of asset (4%), location of user (0%), different platform tariffs (27%), no price discrimination (58%)}	Staub et al. (2021); Tremblay (2020); Gibbs et al. (2018)
DP1	Asset provider's revenue model type	DP1 = {sales model (75%), rental model (0%), pay per use model (13%), donation and sponsorship model (13%)}	Derave et al. (2022); Weking et al., (2020b)
DP2	Asset provider's revenue stream	DP2 = {sales of assets (75%), rental fees for assets (0%), usage fees for assets (13%), donations or sponsorships (13%)}	Weking et al., (2020b); Gibbs et al. (2018)
DP3	Asset provider's revenue source	DP3 = {asset consumers (88%), asset broker (13%), third party (0%)}	Curtis and Mont (2020); Parker et al. (2016)
DP4	Payment frequency of the asset price	DP4 = {pay per asset subscription (13%), pay per asset use (13%), pay per rent (0%), pay once (63%), pay whenever you want (13%)}	Weking et al. (2020a); Kübel and Zarnekow (2014); Parker et al. (2016)
DP5	Price discovery of the asset price	DP5 = {asset price set by asset broker (0%), asset price set by asset providers (75%), asset price set by asset consumers (13%), asset price set by negotiation (13%)}	Derave et al. (2022); Staub et al. (2021); van de Ven et al. (2021); Täuscher and Laudien (2018)
DP6	Price mechanism of the asset price	DP6 = {fixed asset pricing (63%), variable asset pricing (38%)}	Freichel, Fieger, and Winkelmann (2021); Rohn et al. (2021); Curtis and Mont (2020); Täuscher and Laudien (2018)
DP7	Price discrimination of the asset price	DP7 = {quantity of asset (0%), location of user (0%), type of user (13%), no price discrimination (88%)}	Derave et al. (2022); Curtis and Mont (2020); Täuscher and Laudien (2018)

The number in brackets indicates how many of the 26 identified platform revenue models exhibit this characteristic first C2E iterations and iterative refinement through the E2C iterations avoided overlapping and resolved ambiguities. Characteristics derived from C2E iterations with no observed empirical occurrence are documented in Table 4 and identified as having a 0% occurrence rate but theoretical relevance (TDR 19).

Steps 11–14: Ending conditions met?

The objective and subjective ending conditions required by TDR 17 were met after four iterations and are detailed in ESM1–Supplement D, indicating that the taxonomy had reached a level of reliability and completeness justifying the conclusion of the development process. By the 4th iteration, no further changes were detected, as shown in Table 5.

Phase V: Evaluation

To collect evaluation data, a controlled experiment was conducted with ten participants, divided into a test group with the taxonomy and a control group without it, who were tasked with creating textual descriptions of a platform revenue model for the MSP use case. The evaluation concept and its goal are structured according to the Goal Question Metric (GQM) approach of Basili et al. (2002), a widely accepted measurement approach in software engineering (van Solingen & Berghout, 1999), which, in the context of design science research, has been discussed as a way to derive measurable indicators from evaluation goals and research questions (R. J. Wieringa, 2014). Accordingly, the approach was chosen to ensure a transparent link between RQ2 as reflected in the evaluation goal, the associated hypotheses, and the concrete measures applied in the controlled experiment.

Step 15: Configure evaluation

The goal is to evaluate the usefulness of the taxonomy in designing platform revenue models from the perspective of digital innovation designers for the MSP use case. This approach ensures that the evaluation addresses the "why", "how", and "what" of the purpose of the taxonomy (TDR 20). The familiar MSP case was reused to ensure that participants had access to comprehensive material, despite the recommendation to use new objects for ex ante taxonomy evaluation (TDR 21). Since the MSP case had not evolved since the taxonomy was developed, it met the criteria outlined in TDR 22, confirming its suitability for evaluation.

Hypotheses

To align the taxonomy evaluation with our research question RQ2, we defined related hypotheses H1, H2, and H3, and metrics. Figure 5 summarizes the evaluation objectives and their relationships.

H1: Using the proposed taxonomy leads to greater completeness in platform revenue model descriptions compared to those designed without it. Completeness refers to the

Table 5 Ending conditions achieved in each iteration

Ending conditions		Descriptions	Iterations 1	2	3	4
Objective	Generalizable*	A representative sample of platform revenue models has been examined to ensure the taxonomy's applicability beyond specific cases				✓
	Inclusive*	The main dimensions and characteristics relevant to platform revenue models are covered			✓	✓
	Conclusive*	No new dimensions or characteristics were added, merged, or split in the final iteration, indicating stabilization of the taxonomy				✓
	Unique*	Each dimension and characteristic is distinct and non-redundant, ensuring that each classification cell represents a unique combination without overlap		✓	✓	✓
Subjective	Concise	The number of dimensions and characteristics is sufficient to differentiate platform revenue models meaningfully without making the taxonomy overly complex to use		✓	✓	✓
	Robust	The dimensions and characteristics provide sufficient differentiation among platform revenue models and provide valuable insights			✓	✓
	Comprehensive	The taxonomy captures all relevant aspects of platform revenue models, ensuring that any platform revenue model can be classified within it		✓	✓	✓
	Extendible	A new dimension, or a new characteristic of an existing dimension, can be easily added to accommodate evolving platform revenue models		✓	✓	✓
	Explanatory	The taxonomy explains key aspects of platform revenue models by providing meaningful insights into their structure, characteristics, and behavior	✓	✓	✓	✓

*Note: Marked terms are named by the authors, while all descriptions are based on Nickerson et al. (2013)

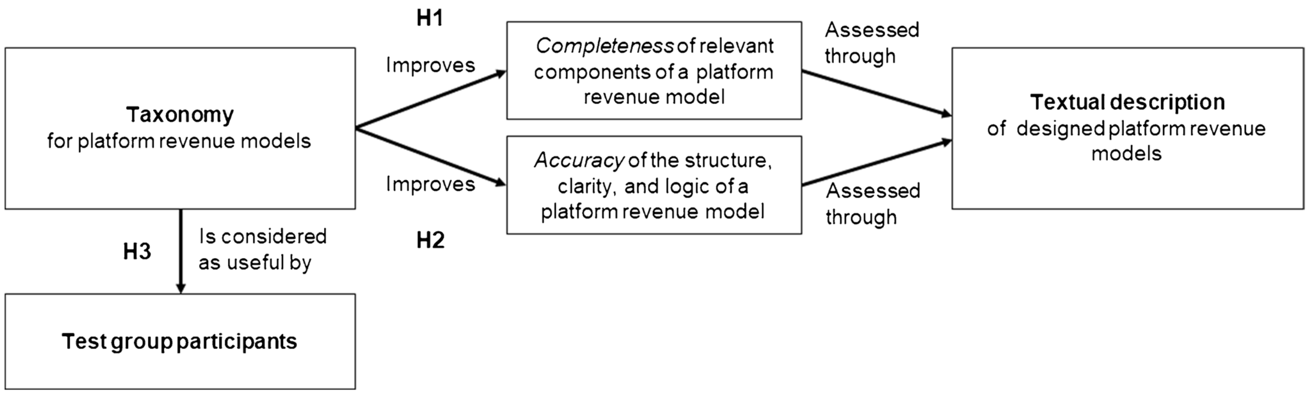


Fig. 5 Concept to configure the evaluation

extent to which all relevant components of a platform revenue model are covered in the generated descriptions. M1.1: The "average coverage rate" of the described platform revenue models is measured by the authors for both the test and control groups. M1.2: The "average completeness grade" of the described platform revenue models is rated by experts for both the test and control groups.

H2: Using the proposed taxonomy leads to greater accuracy in platform revenue model descriptions compared to those designed without it. Accuracy refers to a well-structured, clear, and logically articulated description of a platform revenue model. M2.1: The "average expert grade" of the described platform revenue models is measured by the authors for both the test and control groups. M2.2: Expert feedback is analyzed by the authors to evaluate the quality of the descriptions for both the test and control groups.

H3: Test group participants correctly apply the proposed taxonomy in their task and perceive it as a useful tool for designing platform revenue models. M3.1: Test group participants follow the taxonomy structure and correctly apply its dimensions and characteristics in their descriptions of platform revenue models. M3.2: Test group participants confirm the usefulness of the taxonomy through self-reported feedback and qualitative comments.

Metrics and measurement

For a detailed definition of the metrics, see ESM1-Supplement E. The metrics (M1.1–M3.2) are derived from the taxonomy-related evaluation criteria of Kundisch et al. (2022). The defined metrics enable statistical testing and serve as the basis for answering research question RQ2. A Mann–Whitney *U*-test was used as the statistical method to analyze the data. This non-parametric test was chosen because it is suitable for small sample sizes, like the group of ten participants, and is effective when the data does not follow a normal distribution. A Mann–Whitney *U*-test can be used to compare the mean differences between two independent groups: those who used the taxonomy to design platform revenue models and those who did not. The web-based tool DATAtab[7] was used for statistical calculations. In addition, to measure M3.2, an interview using a 4-point Likert scale and ten closed-ended questions (rated from 1 = disagree to 4 = agree) was conducted with five test subjects to assess their experience with the taxonomy application and its usefulness.

Step 16: Perform evaluation

A detailed documentation of the materials and artifacts produced is provided in ESM2, while the experimental statistics are included in ESM3. The experiment examined a Fraunhofer IESE project and reused the MSP use case. The ten participants were divided into two groups: a test group with the taxonomy (WI) and a control group without the taxonomy (WO). After the ten descriptions of a platform revenue model for the MSP use case were produced, three independent experts evaluated each description. Subsequently, the authors assessed the results.

Protocols for the experiment and the expert assessment

The test group protocol included five online meetings that followed a structured sequence (see ESM2 for more information): (1) introduction, (2) presentations on business model theory and the use case, (3) three quizzes to assess understanding, (4) a task briefing and materials via email, (5) clarification questions, (6) task execution on a Miro[8] board, and (7) interview about taxonomy use.

[7] The web tool can be accessed at https://datatab.de/

[8] The web tool can be accessed at https://miro.com

Participants received presentations, a use case description, and the proposed taxonomy (test group only). The control group followed the same protocol, but without the taxonomy presentation and interview. Participants were given a use case description. All participants used virtual Miro boards to design platform revenue models with freedom to make assumptions.

Three experts independently rated all ten neutral descriptions on Miro boards using a structured feedback template, blinded to taxonomy application and participant identity. The protocol (see ESM2 for more information) included a briefing on the use case and rating task, and a presentation of the platform revenue model theory, with expert 1 in session one and experts 2 and 3 in session two. Expert rating criteria included clarity (ease of understanding of the description), completeness (presence of all essential information), and appropriateness (relevance of the platform revenue model concept described). Each criterion was rated on a three-point scale: "+" (3 points) for positive, "0" (2 points) for neutral, and "−" (1 point) for negative, with optional notes for comments.

Participant composition and expertise

The evaluation involved ten digital innovation designers with software and business skills from Fraunhofer IESE, whose expertise varied from students to seniors. In recruiting participants for the experiment, we sought individuals who possessed a blend of technical and business acumen, essential for grasping the intricate connections between a digital platform's technology and its business model. Figure 6 illustrates the average competencies of participants through a spider chart, where a score of five in each category represents an ideal profile, while a score of zero indicates unsuitability for the experiment. Since the scores in each category were around four and approaching the maximum of five, it was concluded that the profiles of the ten candidates sufficiently met the requirements for participation in the evaluation.

All ten participants were divided into two groups: a test group equipped with the taxonomy (WI) and a control group without it (WO), each consisting of one student, three designers, and one senior designer, as seen in Table 6. All participants worked individually, without collaboration within or across groups.

Over the course of ten individual sessions, the participants created unique revenue model descriptions. These were evaluated by three experts: one internal expert from Fraunhofer IESE, identified as expert 1, with specific domain knowledge in ecosystems from the MSP project, and two external experts (expert 2 and expert 3), who possess years of research experience and have entrepreneurial insights from running their own startup in the platform business sector. We recruited only participants who were not involved in the taxonomy development process, in accordance with TDR 23, to ensure an unbiased perspective in the evaluation.

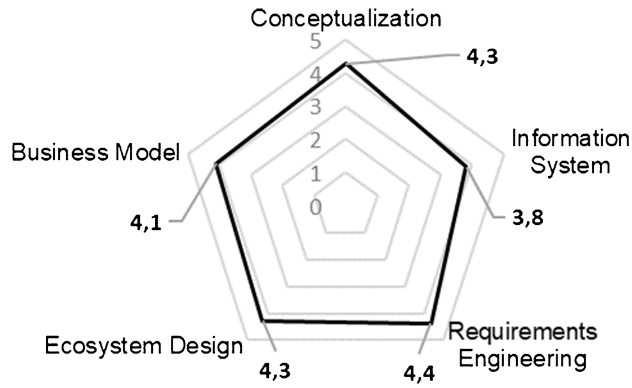


Fig. 6 Average software and business profile scores for experiment participants ($n = 10$)

Table 6 Demographic profile ($n = 10$)

Demographic profile		Number
Gender	Female	7
	Male	3
Age	21–25	1
	26–30	8
	31–35	1
Job status	Student	2
	Digital innovation designer	6
	Senior digital innovation designer	2

Step 17: Evaluation goal met?

To assess whether the evaluation goal was met for hypotheses 1 and 2, the evaluation results are presented in Table 7. The Likert scores from test subjects regarding their experience with the taxonomy application for hypothesis 3 are shown in Table 8. These results are accompanied by a discussion of each hypothesis. A detailed explanation of the results for each metric is provided in ESM1-Supplement E, with all calculations available in ESM3 .

Hypothesis 1 suggests that using the proposed taxonomy improves the completeness of platform revenue model descriptions. This hypothesis was evaluated using two metrics: average coverage rate (M1.1) and average completeness grade (M1.2). Metric M1.1 shows significantly higher coverage rates for descriptions that employed the taxonomy (WI) than those that did not (WO), with rates of 89% vs. 39% for asset brokers, and 82% vs. 29% for asset providers.

Table 7 Descriptive statistics and test results

Dimensions			Descriptive statistic		Mann–Whitney *U*-test		
			Mean	SD	***U***	***p***	***r***
M1.1: average coverage rate	Without	(WO)	35	10	0	0.008	0.83
	With	(WI)	89	11			
M1.2: average completeness grade	Without	(WO)	1	0.3	0.5	0.008	0.80
	With	(WI)	2	0.4			
M2.1: average expert grade	Without	(WO)	4	0.4	0	0.008	0.84
	With	(WI)	6	1.3			

Table 8 Descriptive statistics of Likert scale responses (five participants, 4-point Likert scale: 1 = disagree to 4 = agree)

Statements	Mean	SD
(S1) The taxonomy covers all aspects of platform revenue models	3.6	0.5
(S2) The taxonomy's structure is logical and intuitive	3.2	1.3
(S3) The taxonomy is clear and easy to understand	2.8	0.8
(S4) The taxonomy is presented in a straightforward manner, avoiding unnecessary complexity	3.2	0.8
(S5) The taxonomy feels overwhelming	2.2	1.3
(S6) The taxonomy is easy to apply	3.6	0.5
(S7) The taxonomy allows for the representation of various platform revenue model types	3.8	0.4
(S8) The taxonomy is useful for analyzing platform revenue models	3.4	0.9
(S9) The taxonomy is beneficial for designing new platform revenue models	3.6	0.9
(S10)* The taxonomy has the potential to advance platform business model research	3.8	0.5

*Note: One participant did not provide a response to S10

As seen in Table 7, a Mann–Whitney *U*-test confirmed these differences as statistically significant with a *p* value of 0.008 and a strong effect size of 0.83. Metric M1.2 reveals that WI descriptions were graded higher by experts for completeness compared to WO descriptions. Statistical significance is found with a *p* value of 0.008 and an effect size of 0.8. Given these statistical results, hypothesis 1 is supported: the proposed taxonomy demonstrably enhances the completeness of designed platform revenue models.

Hypothesis 2 suggests that the employment of the proposed taxonomy will yield more accurate descriptions of platform revenue models than those generated without its guidance. To assess the validity of this hypothesis, two metrics are considered: average expert grade (M2.1) and expert feedback (M2.2). For metric M2.1, the analysis of the data reflects a more favorable outcome for the group using the taxonomy (WI), with an average grade of 6 points out of a possible 9, against the 4-point average grade for the group without the taxonomy (WO). Both averages show a difference in the perceived accuracy of the platform revenue model descriptions. The reported *p* value of 0.008 from the Mann–Whitney *U*-test and the effect size (*r*) of 0.84, as seen in Table 7, indicate that this difference is not only statistically significant but also represents a robust effect size, lending strong support to the hypothesis. Metric M2.2 provides qualitative insights through expert feedback, which underscores the clarity and precision achieved by group WI in their descriptions. We attribute this enhancement to the use of the proposed taxonomy. Despite the inherent complexities, the descriptions from group WI appear to be more accurate. In contrast, group WO's descriptions suffered from problems with clarity and logical flow, which negatively affected completeness. Criticism directed at both groups regarding the lack of detail on pricing mechanisms and money flow details highlights an area for improvement but does not detract from the overall findings. The linear regression analysis between "average expert grade" (M2.1) and "average coverage rate" (M1.1) underlined this finding, showing a strong positive correlation ($R = 0.85$), thus suggesting that the more complete the descriptions, the higher their accuracy. In light of the findings from both metrics, hypothesis 2 is supported: the proposed taxonomy demonstrably enhances the accuracy of designed platform revenue models.

Hypothesis 3 evaluates whether users find the proposed taxonomy a useful tool in the design of platform revenue models. This evaluation is informed by analyzing the observed results of the taxonomy's application (M3.1) and the user feedback received (M3.2). Regarding metric M3.1, participants created seven revenue models for asset brokers and five for asset providers, adhering to the taxonomy's structure.

However, an analysis of the 12 models by the authors revealed 11 issues, highlighting confusion in model selection, difficulties in switching perspectives between asset brokers and asset providers, and missing aspects (e.g., lack of specified pricing mechanisms). Further details can be found in ESM3.

For metric M3.2, the taxonomy received mixed feedback across statements (Table 8). While participants considered it a useful tool for designing platform revenue models (S9) and for representing various model types (S7), some perceived it as overwhelming (S5). The taxonomy was also viewed as covering all relevant aspects (S1), having a logical structure (S2), and being easy to apply (S6). However, fewer participants agreed that it is clear and easy to understand (S3), indicating potential issues with clarity. Several participants reported difficulties evaluating certain statements (S1, S7, and S10). Inconsistencies also emerged, as the taxonomy was rated only moderately for understandability (S3) but simultaneously as easy to apply (S6). This divergence suggests that participant responses may not fully reflect a coherent assessment. This is a known issue with user feedback, which can be imprecise or misleading regarding an artefact's actual utility or efficacy (Venable et al., 2016).

Qualitative feedback praised the taxonomy for providing a structured checklist that aids in covering all necessary

Dimensions of a platform revenue model			Characteristics of a platform revenue model						
Revenue model of the asset broker	DB1	Revenue model type of the asset broker	Access model	Listing model	Advertising model	Commission model	Sales model	Donation and Sponsorship model	
	DB2	Revenue stream of the asset broker	Access fees for platform participation	Access fees for platform features	Listing fees on platform	Advertising fees for space	Commission fees	Sales model of platform services	Donations or sponsorships
	DB3	Revenue source of the asset broker	Asset consumers	Asset providers	Third party				
	DB4	Payment trigger of the platform price	Pay per platform access	Pay per asset listing	Pay per user-related contact data	Pay per asset transaction	Pay per platform service use	Pay whenever you want	
	DB5	Payment frequency of the platform price	Pay once	Pay on a recurring basis					
	DB6	Price discovery of the platform price	Platform price set by asset broker	Platform price set by asset providers	Platform price set by asset consumers	Platform price set by negotiation			
	DB7	Price mechanism of the platform price	Absolute value	Percentage value	Variable (negotiated) value	Pay what you want			
	DB8	Price discrimination of the platform price	Type of asset	Type of user	Quantity of asset	Location of user	Different platform tariffs	No price discrimination	
Revenue model of the asset provider	DP1	Revenue model type of the asset provider	Sales model	Rental model	Pay per use model	Donation and sponsorship model			
	DP2	Revenue stream of the asset provider	Sales of assets	Rental fees for assets	Usage fees for assets	Donations or sponsorships			
	DP3	Revenue source of the asset provider	Asset consumers	Asset broker	Third party				
	DP4	Payment frequency of the asset price	Pay per asset subscription	Pay per asset use	Pay per rent	Pay once	Pay whenever you want		
	DP5	Price discovery of the asset price	Asset price set by asset broker	Asset price set by asset providers	Asset price set by asset consumers	Asset price set by negotiation			
	DP6	Price mechanism of the asset price	Fixed asset pricing	Variable asset pricing					
	DP7	Price discrimination of the asset price	Quantity of asset	Location of user	Type of user	No price discrimination			

Fig. 7 Finalized taxonomy for platform revenue models

aspects and facilitating idea generation. Yet, the participants identified challenges with the taxonomy's format and navigation, suggesting that enhancements such as sentence templates and a more intuitive structure could make it more user-friendly. The participants advocated a design overhaul to optimize the taxonomy for practical application. In conclusion, hypothesis 3 is partially supported as participants found the taxonomy useful, but also highlighted challenges and recommended that it be developed into a more practical tool for designing platform revenue models.

Phase VI: Communication

The final taxonomy, developed through the ETDP approach, includes 15 dimensions and 64 characteristics (TDR 25), visualized in Fig. 7 and detailed in ESM1-Supplement F. Clear descriptions of dimensions and characteristics ensure usability (TDR 26). Following TDR 24, the iterative development process is transparently documented in the ESM1-Supplement C, detailing changes and ensuring traceability.

Step 18: Report taxonomy

As seen in Fig. 7, the first dimension of the asset broker (DB1) outlines the asset broker's revenue model type. The revenue stream (DB2) details monetization strategies, including access fees, listing fees, advertising fees, commission fees, and donations and sponsorships. The revenue source (DB3) specifies who is monetized, whether asset consumers, asset providers, or third parties. The payment trigger (DB4) addresses the timing, e.g., pay per access, while the payment frequency (DB5) defines the frequency of charges, i.e., one-time or recurring. Price discovery (DB6) delves into the platform price setting, potentially by asset brokers, asset providers, asset consumers, or through negotiations. The price mechanism (DB7) examines how supply and demand influence platform pricing, be it fixed, variable, or negotiable, and price discrimination (DB8) explores pricing strategies for the platform price, such as user type, location, or tariff options like basic or premium.

The first dimension of the asset providers (DP1) describes the asset provider's revenue model type. The revenue stream (DP2) focuses on monetization strategies, such as sales of assets, rentals, usage-based charges, and donations or sponsorships. The revenue source (DP3) defines who is monetized by the asset providers, including asset consumers, the asset broker, or third parties. Payment frequency (DP4) details payment regularity, i.e., one-time, subscription, usage, or rental-based. Price discovery (DP5) discusses asset price determination, involving brokers, providers, consumers, or negotiations. The price mechanism (DP6) analyzes the influence of market forces on prices, which can be fixed or variable. Price discrimination (DP7) considers price variations based on factors like quantity or user location.

Limitations

This study has some limitations, which are structured according to the framework proposed by Wohlin et al. (2024), covering construct, internal, external, and conclusion threats to validity.

Construct validity concerns whether the taxonomy accurately captures the concept of platform revenue models. During the 4th iteration of development, two project use cases (SLR and MSP) were analyzed in a single empirical-to-conceptual (E2C) iteration. Combining both cases may have affected construct validity. However, no further changes emerged in the final case (MSP), so we consider the taxonomy to be stable. Still, due to the evolving nature of platform business models, future iterations may uncover additional relevant dimensions. Furthermore, there is some potential overlap between dimensions, which may affect robustness. "Revenue model type" (DB1) and "revenue stream" (DB2) both relate to the revenue mechanism but capture different levels of abstraction and are well supported in the literature (cf. Table 4), so they were retained separately. A similar case applies to "payment trigger" (DB4) and "payment frequency" (DB5): in SLR's listing model, asset providers pay both a one-time and a recurring fee per listed solution, making it necessary to distinguish the trigger "pay per asset listing" from the frequency dimension ("pay once" or "recurring"). Finally, while the taxonomy comprises 15 dimensions, this number exceeds the heuristic of seven plus or minus (Nickerson et al., 2013).

Internal validity addresses whether the observed effects in the experiment can be attributed to the use of the taxonomy rather than other factors. The taxonomy was used as a normative model by the authors to assess the completeness of the descriptions created by the test and control groups (see M1.1). This may have contributed to the higher completeness observed in the test group. However, expert evaluation (M1.2) supports the usefulness of the taxonomy and indicates that it covers the essential components of platform revenue models. In addition, potential bias in participants' subjective assessments of the taxonomy's usefulness (M3.2) must be acknowledged. Similarly, author bias during qualitative data analysis cannot be ruled out, despite mitigation efforts such as detailed documentation to support external verification.

External validity concerns the extent to which the findings can be generalized beyond the study context. The controlled experiment involved a small sample of ten participants with specific backgrounds. Although the results were statistically significant, the limited sample size and expertise constrain generalizability. Subject profiles were documented to increase transparency. Moreover, the artificial setting of the experiment lacked real-world business pressures, which may have affected participant engagement and reduced the practical robustness of the resulting models. The absence of evaluation by industry platform managers constrains the practical generalizability of the findings. Finally, the taxonomy was applied to transaction platforms operating in Germany, which may limit its applicability to other platform types, such as innovation platforms, and different regional or institutional contexts.

Conclusion validity refers to the extent to which the observed effects can be attributed to the treatment rather than to chance. Despite the small sample size, the experiment yielded statistically significant results across all measured variables. Mann–Whitney U-tests revealed significant differences between the test and control groups in terms of coverage rate ($U=0$, $p=0.008$, $r=0.83$), completeness grade ($U=0.5$, $p=0.008$, $r=0.80$), and expert evaluation ($U=0$, $p=0.008$, $r=0.84$). These values indicate large effect sizes, supporting the robustness of the observed differences. In addition, expert ratings substantiate the practical value of the taxonomy.

Future work

Building on the identified threats to validity, future research should replicate the experiment with larger and more diverse samples to confirm the robustness and generalizability of the results. Second, evaluations in more realistic, business-relevant settings could enhance external validity and practical applicability. Future research should incorporate evaluations with platform managers to enhance practical applicability. Third, to improve construct validity, further studies could examine whether the distinction between closely related dimensions is meaningful and consistent across different platform contexts. Fourth, to reduce potential researcher bias and strengthen internal validity, automated classification techniques could be integrated to support qualitative analysis. In addition, future research could also investigate business model archetypes (cf. Bergman et al., 2022; Duparc et al., 2022).

Conclusion

While existing research provides valuable insights into the architecture and design of platform business models (Fehrer et al., 2018; Kim, 2016; Täuscher & Laudien, 2018), a systematic understanding of how platform revenue models can be classified and designed remains underdeveloped. To address this gap, we apply the enhanced taxonomy development process (Kundisch et al., 2022) to develop and evaluate a taxonomy for platform revenue models. The taxonomy consists of 15 dimensions and 64 characteristics, directly addressing RQ1. Furthermore, we demonstrate the taxonomy's usefulness by evaluating its applicability in a controlled experiment, thereby addressing RQ2.

This study makes two main contributions: first, we present the taxonomy along with detailed descriptions of all characteristics, and its dimensions reflect the perspectives of both asset brokers and asset providers. This distinction responds to calls for a clearer separation in the value-capture logic of platforms (Hein et al., 2020; Helfat & Raubitschek, 2018). From a practical standpoint, the taxonomy offers a structured framework for designing and analyzing platform revenue models. It enables practitioners to align revenue strategies with platform operational roles and asset offerings. From a theoretical perspective, our taxonomy advances research by conceptualizing revenue-related design choices (e.g., revenue streams and price discovery) for platform operators and asset providers, thereby contributing to a more nuanced understanding of multi-sided value capture across different platform roles (Hein, 2020; Helfat & Raubitschek, 2018). This study also extends prior research on the interplay of multiple revenue model strategies (Daxhammer et al., 2019; Li, 2023), as illustrated by the analyzed cases—for example, Tyre24's combination of access and commission models with interdependent pricing structures that mutually influence each other.

Second, the seven platform cases observed during the taxonomy development phase illustrate the complexity of real-world platform revenue models, resulting in the identification of 26 distinct revenue model types. In line with prior research by Täuscher and Laudien (2018), who report that commission models are used by asset brokers in 72% of observed platform cases, our analysis reveals a comparable pattern, with commission models present in 71% of the platforms examined. However, when analyzing all 26 revenue model types identified across the seven platforms, commission-based models occur only 7 times (27%), while access-based models appear 9 times (35%). Although the number of cases in our study is limited, the findings reveal an important insight: several platforms employ multiple revenue models simultaneously to capture value, such as Tyre24 (five revenue model types) and Vinted (six types), whereas others follow a more narrowly focused approach, such as empto (two types) or MyHammer (one type). This discrepancy underscores the prevalence of mixed monetization strategies in platform contexts and opens up new avenues for future research on the interplay between complementary and mutually exclusive platform revenue model types.

In conclusion, by drawing on a theoretical foundation developed through a literature review, together with empirical grounding through the analysis of existing platform cases and evaluation in a controlled experiment, this study integrates current insights from both research and practice on platform revenue models. Accordingly, this research lays the groundwork for future studies and promotes the development of platform revenue models as a focused line of inquiry within the broader field of business models.

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Declarations

Competing interest The authors declare no competing interests.

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