

ORIGINAL RESEARCH

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A Taxonomy of Digital Revenue Models in Business Management: Subscription, Freemium, Marketplace, Pay-Per-Use, Licensing, and Data-Enabled Models

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Abstract

Digital business has expanded the number and variety of revenue models through which firms capture value from software, platforms, data, digital services, and online ecosystems. Subscription, freemium, marketplace, pay-per-use, licensing, and data-enabled models are now widely used across sectors, but their conceptual boundaries are often blurred. This makes it difficult for researchers and managers to compare models systematically. The problem addressed in this article is the lack of a clear taxonomy for distinguishing digital revenue models in business management. Existing terminology often mixes pricing mechanisms, business model architectures, customer access rights, platform intermediation, and data monetization under overlapping labels. As a result, revenue model analysis may become imprecise, fragmented, or overly case-specific. The objective of this article is to develop a rigorous taxonomy of digital revenue models based on explicit classification criteria. The taxonomy classifies digital revenue models into six categories: subscription, freemium, marketplace, pay-per-use, licensing, and data-enabled models. These categories are differentiated according to revenue generation logic, payment structure, value unit, customer relationship, scalability mechanism, and governance requirement. The resulting taxonomy provides definitions, sub-types, comparative criteria, and governance implications for each model. It contributes a shared vocabulary for studying digital revenue strategies and offers managers a practical tool for designing, combining, and governing revenue portfolios. The article concludes that digital revenue model selection should be treated not only as a monetization choice but also as a strategic governance decision.

Keywords Taxonomy, Freemium, Subscription, Marketplace, Digital revenue models, Pay-per-use

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Introduction

Digital transformation has multiplied the ways in which firms generate, capture, and scale revenue from digital assets, services, platforms, and data. Teece and Linden argue that digital enterprises require business models that explain not only value creation but also the mechanisms through which value is captured in competitive environments [1]. This emphasis on value capture is especially important because digital offerings often separate production cost, customer

access, usage intensity, and monetization timing. Revenue models therefore sit at the center of digital business strategy rather than functioning as secondary pricing choices.

The diversity of digital revenue models has also increased conceptual ambiguity. Business model research has long recognized that value creation, delivery, and capture are interdependent, yet Foss and Saebi note that business model innovation remains fragmented across theoretical

traditions [2]. Teece further links business models to dynamic capabilities, emphasizing that firms must repeatedly adjust how they capture value as technologies, markets, and customer expectations change [3]. In digital environments, this adjustment often produces hybrid revenue structures that combine subscription access, freemium conversion, transaction fees, usage charges, licensing, and data monetization.

This article addresses the need for a taxonomy that distinguishes digital revenue models according to their core revenue logic. Prior work on business model patterns has shown that systematic classification can help researchers compare models and managers design alternatives more deliberately [4]. Similarly, hierarchical taxonomies of business model patterns demonstrate that categories must be organized around explicit criteria rather than loose descriptive labels [5]. Building on this logic, the present article classifies six digital revenue models: subscription, freemium, marketplace, pay-per-use, licensing, and data-enabled models.

The article proceeds by explaining why a digital revenue model taxonomy is needed, then defining the classification criteria used to construct the taxonomy. It subsequently develops the six model categories and compares them across revenue logic, pricing dynamics, customer relationship, risk profile, and governance requirements. Platform and marketplace studies show that digital revenue models often depend on transaction architecture and ecosystem position rather than only on price level [6]. Data monetization research adds a further layer by showing that value capture may occur directly through data products or indirectly through advertising, personalization, and analytics-enabled decisions [7, 8].

Need for a Digital Revenue Model Taxonomy

A taxonomy is necessary because the language of digital revenue models is often inconsistent across research streams. Studies of digital business models, digital servitization, platforms, pricing, and data monetization frequently use different labels for similar mechanisms or similar labels for different mechanisms [9, 10]. For example, a subscription may be treated as a pricing model, a customer relationship model, or a service business model depending on the literature. Without classification criteria, these differences make cumulative theory building difficult.

Existing classifications are also fragmented because they often focus on only one revenue domain. Platform research emphasizes marketplaces, network effects, and transaction fees, while servitization research emphasizes recurring digital services and outcome-based value capture [11, 12]. Pricing research often distinguishes subscription, freemium, and usage-based models through payment structure and customer conversion, whereas data monetization research focuses on information assets, privacy, and indirect value capture [7, 13]. A unified taxonomy can connect these streams without collapsing their distinctive mechanisms.

Managerially, the lack of a taxonomy weakens strategic decision-making because revenue model choices shape capabilities, risks, metrics, and governance systems. Digital transformation research shows that firms must align customer interfaces, operational processes, data systems, and organizational structures when changing business models [9]. Revenue model choices are therefore not isolated commercial decisions but architecture-level choices that affect retention, pricing control, partner incentives, compliance exposure, and scalability. A robust taxonomy helps managers compare options systematically rather than adopting fashionable monetization labels without understanding their implications.

Classification Criteria

The taxonomy developed in this article is based on the principle that revenue models should be differentiated by how value is captured, from whom payment is collected, what unit of value is monetized, and what governance problem the model creates. Business model pattern research supports the use of formal classification dimensions because pattern labels alone are insufficient for analytical comparison [4, 5]. In digital contexts, these dimensions must account for recurring access, free-to-paid conversion, platform matching, usage measurement, intellectual property rights, and data-driven monetization. The aim is not to describe every possible hybrid but to identify the primary revenue logic that defines each model.

The first classification criterion is revenue generation logic. Subscription models monetize continuing access, freemium models monetize conversion from free to premium use, marketplace models monetize transactions or participation among multiple sides, pay-per-use models monetize measured consumption, licensing models monetize rights to use intellectual property or technology, and data-enabled

models monetize data directly or indirectly. Research on digital servitization shows that recurring digital services require firms to design revenue capture around continuing value delivery rather than one-time sales [11, 14]. Platform research similarly shows that marketplaces capture revenue by organizing interactions between users rather than by selling a conventional product [6].

The second criterion is payment structure, which distinguishes fixed recurring fees, tiered premium payments, commissions, metered charges, royalties, and data-linked revenue streams. Subscription valuation research demonstrates that recurring payment structures require attention to customer lifetime value, churn, acquisition cost, and cohort economics [15]. Freemium research shows that pricing is shaped by the relationship between free access, premium feature design, and conversion incentives [13, 16]. Pay-per-use and software-as-a-service studies further indicate that digital pricing may be tied to consumption, functionality, seats, transactions, or operational intensity [17, 18].

The third criterion is the primary value unit, which identifies what the customer, platform participant, licensee, or advertiser is paying for. In subscription models the value unit is access, in freemium it is premium functionality, in marketplace models it is matching or transaction facilitation, in pay-per-use it is measured consumption, in licensing it is permission to use an asset, and in data-enabled models it is data, insight, attention, or personalization. Table 1 defines the classification criteria used to differentiate the six digital revenue models. These criteria draw on taxonomy development logic in business model research and extend it to digital revenue categories where value capture depends on access, usage, intermediation, rights, and data flows [5, 19].

Table 1. Classification Criteria for Digital Revenue Models: Revenue Generation Logic, Payment Structure, and Value Unit

Classification criterion	Taxonomic purpose	Application to digital revenue models	Analytic question classification
Revenue generation logic	Identifies the core mechanism through	Distinguishes recurring access, free-to-paid	How does firm primary generate revenue fr

	which the firm captures value	conversion, transaction intermediation, metered consumption, rights-based monetization, and data-enabled monetization	the digit offering
Payment structure	Specifies how and when customers, users, partners, or advertisers pay	Includes recurring fees, premium upgrades, commissions, usage charges, licensing fees, royalties, advertising payments, or data service fees	What is the formal payment arrangement attached to the revenue model?
Primary value unit	Defines what is being monetized	Includes access, premium functionality, match, transaction, usage unit, intellectual property, software right, dataset, insight, or attention	What unit of value is exchanged for revenue?
Customer relationship structure	Clarifies whether the model depends on retention, conversion, repeated usage, transaction frequency, license renewal, or	Separates models based on whether revenue depends on loyalty, upgrading, platform participation, consumption volume, contractual	What type of relationship must be maintained for revenue to continue?

	data relationship depth	rights, or data continuity		retention, renewal, churn control, and customer lifetime value central to performance measurement. McCarthy, Fader, and Hardie show that subscription businesses can be valued through customer-level data when firms disclose acquisition, retention, and cohort information [15]. This makes subscription revenue especially attractive in digital settings because recurring access can stabilize cash flow while enabling continuous service improvement.
Scalability mechanism	Explains how revenue grows in digital environments	May depend on subscriber base expansion, conversion rate, network effects, usage volume, replication of licensed assets, or data accumulation	What drives revenue scaling at the digital infrastructure level is established	Subscription models vary by payment interval, access tier, bundling structure, and service scope. In software-as-a-service, firms may charge by user seat, enterprise license tier, function package, storage level, or usage threshold, while media and content subscriptions often rely on monthly or annual access bundles. Li and Kumar show that software-as-a-service pricing requires operational alignment between customer access, service delivery, and pricing design [18]. Nansubuga and Kowalkowski further emphasize that moving to subscriptions involves business model innovation because firms must shift from product transactions to ongoing service relationships [20].
Governance requirement	Identifies the main managerial control issue created by the model	Includes churn management, free-tier design, platform trust, usage transparency, IP control, privacy compliance, algorithmic accountability, and data ethics	What must managers govern to keep the revenue model sustainable and legitimate	Freemium models combine a free basic offering with paid premium access, creating a revenue logic based on conversion rather than immediate payment from all users. Gu, Kannan, and Ma show that premium design in freemium settings depends on how firms allocate value between free and paid versions so that the free tier attracts users without eliminating upgrade incentives [13]. Mäntymäki, Islam, and Benbasat add that premium subscription decisions depend on perceived consumer value, not only on price differences [16]. Freemium is therefore a hybrid access-conversion model in which the free tier functions as both marketing infrastructure and product experience.
Boundary condition	Prevents category overlap by identifying the dominant revenue logic	Helps classify hybrid models according to their primary source of value capture rather than all visible payment features	Which revenue logic is dominant when several mechanisms coexist	Pay-per-use models generate revenue through metered consumption, making the value unit a measured action, time unit, transaction, computation, download, service episode, or resource consumed. Wang, Dada, and Sahin show that ancillary service subscriptions and related pricing structures can combine recurring and usage-sensitive elements, highlighting the boundary between subscription and metered revenue [17]. Digital sampling and versioning research also shows that firms can vary access, feature exposure, and monetization timing across the customer lifecycle [21, 22]. Table 2 describes the subscription, freemium, and pay-per-use models with their defining features, sub-types, and key examples.

Subscription, Freemium, and Pay-Per-Use Models

Subscription models generate revenue through recurring payments for continuing access to a digital product, service, platform, or bundle. Their core logic is not ownership transfer but sustained access, which makes

Table 2. Subscription, Freemium, and Pay-Per-Use Revenue Models: Definitions, Sub-Types, and Characteristics

Revenue model	Core definition	Main sub-types	Primary value unit
Subscription	Recurring payment for continuing access to a digital product, service, platform, or bundle	Flat-rate subscription; tiered subscription; seat-based subscription; bundled subscription; enterprise subscription	Continued access
Freemium	Free basic access combined with paid premium functionality, content, or service quality	Feature-limited freemium; usage-limited freemium; advertising-supported free tier; trial-to-premium; community-to-premium	Premium upgrade
Pay-per-use	Payment based on measured consumption, use episode, transaction volume, or resource intensity	Usage metering; per-transaction billing; pay-as-you-go cloud services; per-download payment; consumption-based digital service	Measured use unit
Subscription–usage hybrid	Recurring access combined with variable charges for excess or	Base subscription plus overage; subscription plus credits; tiered	Access plus incremental consumption

	advanced usage	allowance plus metering	
Freemium–subscription hybrid	Free basic access combined with recurring premium plans	Free tier plus monthly premium; free tier plus enterprise subscription; free tier plus professional upgrade	Free access and recurring premium value

Marketplace and Licensing Models

Marketplace models generate revenue by facilitating interactions between two or more participant groups, typically buyers and sellers, service providers and customers, or complementors and users. Their revenue logic is transactional and architectural because the firm monetizes the match, exchange, listing, payment, lead, or participation rather than the direct production of the exchanged good. Täuscher and Laudien show that marketplace business models vary across value proposition, interaction design, and revenue mechanisms, but they share the platform function of enabling exchange [6]. This distinguishes marketplaces from subscription and pay-per-use models, where the firm usually charges for access to or consumption of its own digital service.

Marketplace monetization commonly includes commissions, transaction fees, listing fees, lead-generation fees, advertising fees, seller subscriptions, payment processing margins, or premium placement charges. Platform revenue model research shows that platform monetization must account for which side pays, when payment is triggered, and how pricing affects network participation [23]. Because marketplaces depend on network effects, revenue extraction must be balanced against participation growth and trust. Boudreau, Jeppesen, and Miric show that freemium competition with network effects can reshape digital competition, a logic that also applies to marketplace pricing when free participation is used to build scale before monetization [24].

Licensing models generate revenue by granting rights to use software, digital assets, intellectual property, data

interfaces, algorithms, brands, or technological components. Unlike subscription, which charges for continuing access, licensing is rights-based and often governed by contractual permission, scope of use, duration, territory, exclusivity, and royalty structure. Bodendorf, Franke, and Hoof show that software license valuation and pricing are important in vendor negotiations because licensing revenue depends on perceived utility, contractual terms, and customer-specific value [25]. Licensing can therefore be understood as asset-based digital value capture rather than direct consumption-based monetization.

Marketplace and licensing models differ from the previous categories because they monetize structural position or intellectual property rather than only user access or usage volume. Marketplace models scale through interaction density, network effects, trust infrastructure, and transaction liquidity, while licensing models scale through replicability, enforceable rights, partner adoption, and contractual control. Hacklin, Björkdahl, and Wallin describe how firms adapt business model strategies when value migrates across industries, which is especially relevant when digital firms shift from product sales toward platform intermediation or licensing [26]. Table 3 describes the marketplace and licensing revenue models with their defining mechanisms and monetization drivers.

Table 3. Marketplace and Licensing Revenue Models: Transaction Architecture, Fee Structures, and Monetization Logic

Revenue model	Core definition	Main monetization mechanisms	Primary value unit
Marketplace	Revenue generated by facilitating exchange between two or more participant groups	Commission, transaction fee, listing fee, lead fee, payment margin, seller service fee	Match or transaction
Commission marketplace	Platform takes a percentage of	Percentage fee, service fee, payment	Completed transaction value

	completed transactions	processing fee	
Listing or lead marketplace	Platform charges for visibility, leads, or listing access	Listing fee, sponsored placement, lead fee, promoted profile	Visibility or qualified lead
Licensing	Revenue generated by granting permission to use software, intellectual property, technology, content, data interface, or brand asset	Fixed license fee, royalty, usage license, enterprise license, technology transfer fee	Permission or usage right
Royalty-based licensing	Licensee pays according to sales, usage, distribution, or output linked to licensed asset	Percentage royalty, per-unit royalty, minimum guarantee plus royalty	Commercial exploitation of licensed asset

Data-Enabled Revenue Models

Data-enabled revenue models generate value by monetizing data, insights, attention, prediction, personalization, or analytics-enabled services. They differ from other models because the revenue logic depends on information assets and data relationships rather than only access, transactions, usage, or intellectual property rights. Parvinen, Laitila, Pöyry, Gustafsson, and Rossi argue that data monetization requires firms to develop data-based business models that transform data resources into commercial value [8]. Ofulue and Benyoucef similarly identify data monetization as a distinct research domain

requiring attention to value creation, value capture, and organizational capabilities [7].

Direct data monetization occurs when firms sell datasets, data products, analytics outputs, benchmarks, forecasts, or insights-as-a-service. Automotive data marketplace research shows that data can be exchanged through marketplace structures, but the revenue logic remains data-enabled because the tradable value unit is information rather than a conventional product or service [27]. Connected car business model taxonomies also show that sensor-generated data can support multiple monetization pathways, including analytics, service optimization, partner ecosystems, and usage-based offerings [28]. These examples show that data-enabled models often operate across ecosystem boundaries.

Indirect data monetization occurs when data improves revenue from another model, such as advertising, recommendation, personalization, dynamic pricing, risk scoring, or customer segmentation. Quach, Thaichon, Martin, Weaven, and Palmatier emphasize that digital technologies create tensions around privacy and data because commercial value often depends on collecting, analyzing, and applying customer information [29]. This makes data-enabled revenue models especially governance-sensitive compared with subscription or licensing models. Revenue can be significant, but legitimacy depends on consent, transparency, security, fairness, and accountability.

Data-enabled models also create boundary problems because data can support subscription, marketplace, pay-per-use, and licensing models without being the primary source of revenue. The taxonomy classifies a model as data-enabled only when data, insight, attention, or analytics is the dominant monetized value unit. Digital transformation research warns that firms must manage data, technology, customer interaction, and organizational change together rather than treating digital data as an isolated resource [9, 30]. Table 4 defines data-enabled revenue models, including direct and indirect monetization and ethical boundaries.

Table 4. Data-Enabled Revenue Models: Direct Monetization, Indirect Monetization, and Data-Driven Value Propositions

Data-enabled model type	Core definition	Main revenue mechanism	Pri valu
Direct data sales	Revenue from selling datasets, data feeds, or structured data access	Data sale, subscription data feed, data licensing, API access fee	Data data
Insights-as-a-service	Revenue from analytics, predictions, dashboards, or decision intelligence	Analytics subscription, report fee, predictive service fee, benchmark access	Interp or in
Data-driven advertising	Revenue from using user data to target, personalize, or optimize advertising	Advertising fee, cost per click, cost per impression, cost per acquisition	Attent targ acc
Personalization-enabled monetization	Revenue uplift generated indirectly through personalized offers, recommendations, pricing, or content	Higher conversion, retention, cross-selling, dynamic pricing uplift	Persc rele
Data marketplace model	Revenue from enabling exchange of data products between providers and buyers	Commission, listing fee, access fee, transaction fee	Tra data

Comparative Taxonomy Matrix

The comparative taxonomy matrix consolidates the six models into a single analytical structure. Its purpose is not to imply that firms use only one revenue model but to clarify the dominant logic that governs each model. Broekhuizen,

Broekhuis, Gijsenberg, and Wieringa argue that digital business models require multidisciplinary analysis because value capture depends on customers, technologies, platforms, and stakeholders simultaneously [31]. A comparative matrix therefore helps researchers and managers examine models across multiple dimensions rather than reducing them to pricing labels.

The six models differ first in revenue logic and pricing dynamics. Subscription models rely on recurring access fees, freemium models on free-to-paid conversion, marketplace models on transaction architecture, pay-per-use models on metered consumption, licensing models on rights-based fees, and data-enabled models on information-derived value. Revenue model research in digital services shows that model selection must align with customer value perception, service scalability, and firm capability [11, 14, 32]. This means that a technically feasible revenue model may still fail if its payment structure does not match how customers perceive value.

The models also differ in customer relationship and risk profile. Subscription models require continuous engagement, freemium models require conversion without excessive free-user cost, marketplace models require trust among multiple sides, pay-per-use models require transparent metering, licensing models require contractual control, and data-enabled models require privacy legitimacy. Ghezzi and Cavallo show that digital entrepreneurship often uses agile business model innovation, but agility does not eliminate the need for disciplined revenue logic [33]. The taxonomy therefore supports experimentation while preserving conceptual clarity.

The matrix also highlights governance requirements. Subscription governance emphasizes churn, renewal, and service quality; freemium governance emphasizes free-tier boundaries; marketplace governance emphasizes platform rules, fairness, and disintermediation; pay-per-use governance emphasizes measurement and billing transparency; licensing governance emphasizes IP control; and data-enabled governance emphasizes privacy, consent, and ethical use. Business model pattern research shows that archetypes and taxonomies are most useful when they clarify not only categories but also design choices and managerial implications [4, 5]. **Table 5** presents the comparative taxonomy matrix across all six revenue models.

Table 5. Comparative Taxonomy Matrix of Digital Revenue Models: Comparison across Revenue Logic, Pricing Dynamics, Customer Relationship, Risk Profile, and Governance Requirements

Revenue model	Dominant revenue logic	Pricing dynamics	Customer relationship logic
Subscription	Recurring access monetization	Fixed or tiered recurring fees	Retention renewal, continued perceived value
Freemium	Conversion from free access to paid premium value	Free basic tier plus paid premium tier	Acquisition through free use, monetization through upgrade
Marketplace	Monetization of exchange among multiple sides	Commission, transaction fee, listing fee, lead fee, sponsored placement	Trust-based participation among buyers, sellers, or complementors
Pay-per-use	Monetization of measured consumption	Per unit, per action, per transaction, per resource, or pay-as-you-go pricing	Customer payment in proportion to usage intensity
Licensing	Monetization of rights to use intellectual property, software, technology, or digital assets	Fixed license fee, royalty, usage license, enterprise contract	Contractual permission and renewal
Data-enabled	Monetization of data, insight, attention,	Data sale, analytics subscription,	Data relationship based on

	personalization, or analytics	advertising fee, insight fee, indirect uplift	consent, relevance, & trust
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Figure 1 presents the integrated taxonomy of six digital revenue models by linking each model to its dominant value unit, revenue logic, and governance requirement.

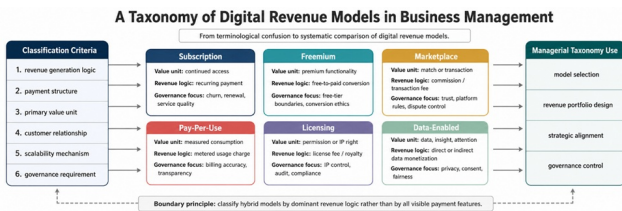


Figure 1. Integrated Taxonomy of Digital Revenue Models: Revenue Logic, Value Unit, and Governance Requirements across Subscription, Freemium, Marketplace, Pay-Per-Use, Licensing, and Data-Enabled Models

Managerial Use and Governance Implications

The taxonomy can help managers select revenue models by matching revenue logic to customer value, operational capability, and strategic position. Teece argues that business models and dynamic capabilities are connected because firms must sense opportunities, seize them through value capture designs, and reconfigure capabilities over time [3]. A subscription model may fit when customers value ongoing access, while a pay-per-use model may fit when usage intensity varies significantly across users. A marketplace model may be appropriate when the firm can orchestrate transactions, whereas licensing may fit when the firm controls valuable software, content, algorithms, or intellectual property.

The taxonomy also supports revenue portfolio design because many digital firms combine models. A software firm may use freemium acquisition, subscription retention, enterprise licensing, usage-based expansion, and data-enabled analytics in the same portfolio. Verhoef, Broekhuizen, Bart, Bhattacharya, Dong, Fabian, and Haenlein emphasize that digital transformation is multidisciplinary and requires coordination across strategy, technology, marketing, and organization [9]. The taxonomy helps managers identify when such combinations are complementary and when they create conflicting incentives, customer confusion, or governance overload.

Governance implications differ sharply across the six categories. Subscription models require monitoring churn, service quality, renewal fairness, and customer fatigue, while freemium models require governance of the boundary between free and paid value. Marketplace models require rules for participant quality, search visibility, dispute resolution, pricing power, and platform trust, while licensing models require contractual discipline, audit rights, and enforcement. Digital servitization research shows that revenue model design must be connected to value delivery systems, because firms cannot sustainably charge for digital services unless customers perceive continuing value [11, 32].

Data-enabled models require the most explicit ethical and compliance governance because the monetized asset is often derived from user behavior, transaction traces, or personal information. Quach, Thaichon, Martin, Weaven, and Palmatier show that digital technologies intensify tensions between commercial data use and privacy expectations [29]. Managers should therefore treat data-enabled revenue not merely as a growth opportunity but as a legitimacy-sensitive revenue model requiring consent management, transparency, security, fairness checks, and accountability routines. Across all six models, the taxonomy encourages managers to evaluate not only revenue potential but also the governance system required to sustain the model responsibly.

Conclusion

This article developed a taxonomy of digital revenue models in business management to address conceptual ambiguity in the study and practice of digital value capture. It classified six models: subscription, freemium, marketplace, pay-per-use, licensing, and data-enabled revenue models. The taxonomy provides a structured language for distinguishing models that are often treated as interchangeable despite relying on different revenue logics.

The main contribution is a classification system grounded in revenue generation logic, payment structure, primary value unit, customer relationship, scalability mechanism, and governance requirement. By comparing the six models across these dimensions, the article clarifies how digital firms capture value through access, conversion, intermediation, usage, rights, and data. It also shows that hybrid revenue portfolios can be analyzed more rigorously when the dominant revenue logic is identified.

Future research should empirically test the taxonomy across industries, firm sizes, and platform ecosystems. Researchers can examine which combinations of revenue models improve resilience, profitability, customer trust, or innovation capacity. Managers can use the taxonomy as a practical tool for revenue model selection, portfolio design, and governance alignment in increasingly complex digital business environments.

Acknowledgements

None

Conflict of interest

None

Financial support

None

Ethics statement

None

Received: 05 May 2026 Revised: 15 Jun 2026 Accepted: 25 Jul 2026
Published online: 18 September 2026

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