



# Electronic Markets on business model development

Rainer Alt<sup>1</sup>

Published online: 11 September 2020  
© The Author(s) 2020

Dear readers,

This issue of *Electronic Markets* features a special theme on business model tooling and addresses several design issues in the area of multi-sided platforms as well as privacy, which in turn are relevant for developing business models. Over the years, the topic of business models has had a long tradition in the journal *Electronic Markets*. As mentioned in an editorial six years ago, the business model definition coined by Paul Timmers in 1998 is the highest cited article in the 30 years history of *Electronic Markets* and still referenced today (Alt and Zimmermann 2014). In fact, over the past six years the number of citations has almost doubled compared to the sixteen years before: the 2'200 citations in October 2014 rose to some 4'300 in August 2020 following a Harzing search at Google Scholar. This steep increase illustrates the role of this article in the growing attention of business model research. It has attracted the attention of many researchers in the areas of strategic and innovation management as well as information systems, who have advanced the understanding regarding the structure, the design and the success factors of business models.

## Specifics of business model development

In the information systems field there are two main streams: one the one hand, information systems are enablers for (digital) business models and on the other, they are helpful in developing business models. The enabling role dates back to the notion of strategic information systems, which recognized information technology (IT) as a “competitive weapon” (Ives and Learmonth 1984; Wiseman 1985). In addition to streamlining financial and administrative processes, this perspective regarded IT as an enabler for improving the position in the

marketplace. It took more than one decade until this thinking spurred the first influential publications on business models (see Magretta 2002; Nielsen and Lund 2014) and may be seen as the most profound form of digital transformation. This follows the early argumentation of Venkatraman (1994), who saw business scope redefinition as the ultimate step in his transformational trajectory, which combines high degrees of business transformation and potential benefits. From the conceptual side, business models have become known as intermediate designs between an organization’s overall business strategy and the more specific operational designs of structures, processes and systems (e.g. Veit et al. 2014). With the attention of information systems only shifting over time from administrative-supportive to strategic-enabling, methodological support for developing business models is the youngest in the information systems discipline. Another recent editorial described that at least three periods may be distinguished in the evolution of methods and techniques for digital transformation (Alt 2019, p. 307f), i.e. software (e.g. entity relationship modeling), process (e.g. business process management) and value development (e.g. business model innovation). While the former date back to the 1960s, methodological support for business modeling has only started with the new millennium. Meanwhile, techniques such as the business model canvas (BMC) and methods such as design thinking have spread into practice. At the same time, developing business models is more challenging than developing processes and software. Three specifics might illustrate this:

- *Contingencies*. Contrary to software and processes, which may be debugged and measured, determining whether a business model works is rather difficult. In particular, it depends on the participation of external actors, such as customers, investors as well as other partners (e.g. suppliers, platform providers), who might behave differently when real monetary decisions are required instead of when interviewed to provide feedback on a business model’s plausibility.
- *Formalization*. A business model’s constituting elements are more “high level” and also include more “soft facts”.

✉ Rainer Alt  
rainer.alt@uni-leipzig.de

<sup>1</sup> Information Systems Institute, Leipzig University, Grimmaische Str. 12, 04109 Leipzig, Germany

By their very nature, they are less amenable to being formalized than software and processes. This is apparent in the techniques themselves where entity relationship, UML or BPMN diagrams offer syntactically and semantically predefined shapes and terminology. Business model techniques, such as the nine areas of the BMC, in turn often conceive “modeling” as verbally completing predefined templates.

- *Technology.* Although business models in the age of digitalization are inherently reliant on information systems, the technological aspects are rather weakly reflected in business model templates (Costa and Cunha 2015). For example, the BMC only implicitly includes technological aspects, for example data in the segment “key resources” or social media in the segment “channels”. Little integration among the modeling tools is also present to link the “high level” value models with “lower level” models in the areas of software and processes, which contributes to the presence of multiple models with a high probability of redundancies and inconsistencies.

## Developing business models for electronic markets

Business models are closely related to electronic markets since each business model implies the design and management of a networked setting. It is hard to imagine a business model without customers, suppliers and other partners being involved. Three aspects of business model development shall be addressed in the following, which deem relevant for developing business models for electronic markets. They recognize that electronic markets are (1) multifaceted business models, that they are (2) embedded in a larger dynamic setting and that they are (3) inherently based on software (see Fig. 1).

First, *electronic markets are multifaceted business models.* An electronic market may be seen as a generic business model that is opposed to other business models such as electronic hierarchies. In this view, electronic markets are multisided in

nature and foresee the role of a centralized platform provider who offers trade-facilitating functionalities. The electronic markets reference model (Schmid and Lindemann 1998) mentions this centralized provider role as the business model of the market operator in its upper layer. Similarly, Wigand’s market hierarchy (1997) refers to the electronic market maker as an important actor in electronic commerce. Multiple parties (e.g. suppliers, market participants, autonomous actors, service providers) might decide to adopt such a business model. In addition, electronic markets are not only business models in themselves, but also give rise to other business models on the platform. This is apparent in two-sided marketplaces, where “two user groups [...] interact with each other through one or more intermediaries” (Eisenmann et al. 2006, p. 96). While consumers might not have explicitly formulated business models, a dedicated business model development may be assumed for businesses (i.e. B2C and B2B markets). Multiple business models are conceivable here and range from technological (e.g. computing or development resources) and trading infrastructure (e.g. logistics or payment services) to additional trading services (e.g. shops on a marketplace platforms or meta-comparison services). For example, Riasanow et al. (2020) identified five business model clusters that comprise a total of 15 different roles in digital platforms. As the overview in Table 1 indicates, several other types of business models may be found in the literature on electronic markets with new technologies such as the distributed ledger technology also spurring new business models (e.g. Rückeshäuser 2017). Thus, developing electronic markets (or digital platforms in general) means that not only the business model of one or multiple platform providers needs to be designed, but also the business models of the participating market sides. Archetypes for electronic market business models together with their characteristics and design parameters could contribute to the process of developing electronic markets. In this regard, de Reuver et al. (2018, p. 133) explicitly mention “developing a typology expressing the variety of digital platforms” a main issue in the research on digital platforms. Researchers could draw from the growing knowledge on the architecture of digital platforms (e.g. Zutshi and Grilo 2019) and combine this with the existing methodologies in business

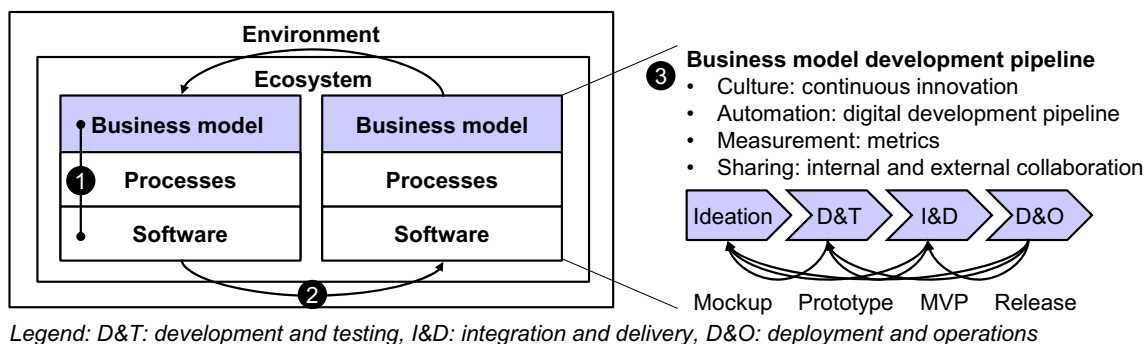


Fig. 1 Business model embeddedness and business model development pipeline

**Table 1** Typologies of electronic markets

Source	Business models
Wigand (1997)	1. Automated market A (simple, largely automated transactions), 2. Automated market B (simple transactions with some human choices/decisions required), 3. Electronic shopping, 4. Fully-fledged electronic commerce utilizing electronic market maker with market-choice box
Timmers (1998)	1. E-Shop, 2. E-Procurement, 3. E-Auction, 4. E-Mall, 5. 3rd party marketplace, 6. Virtual communities, 7. Value chain service provider, 8. Value chain integrator, 9. Collaboration platforms, 10. Information brokers
Kaplan and Sawhney (2000)	1. MRO hubs, 2. Yield managers, 3. Exchanges, 4. Catalog hubs
Grieger (2003)	1. Closed e-market, 2. Open e-market
Petersen et al. (2007)	1. Project/specification managers, 2. Supply consolidators, 3. Liquidity creators, 4. Aggregators, 5. Transaction facilitators
Chelariu and Sangtani (2009)	1. Independent exchange, 2. Consortia, 3. Private exchanges
Kouris and Kleer (2012)	1. Dealer, 2. Platform operator, 3. Infomediary, 4. Trusted third party
Rensmann (2012)	1. Booking sites, 2. Comparison sites, 3. Online travel agencies
Rückeshäuser (2017)	1. Data infrastructure provider, 2. Development facilitator, 3. Integration enabler, 4. Application provider, 5. Supporting or supplementary service provider
Täuscher and Laudien (2018)	1. Efficient product transactions, 2. Digital product community, 3. Product aficionados, 4. On-demand offline services, 5. Online services, 6. Peer-to-peer offline services
Cennamo (2019)	1. Multi-sided transaction market, 2. Complementary innovation market, 3. Information market
Riasanow et al. (2020)	1. Cloud and on-premise infrastructure provider, cyber security provider, 2. Digital financial services, 3. OEMs and IoT solutions, 4. Data prediction and monitoring, 5. Broker and agents

modeling. In addition, the broad body of research in the area of enterprise architecture as suggested in the preface by Bouwman et al. (2020) could help to link the business model layer with the “lower layers” of processes and software (see Fig. 1 left).

Second, *business models are embedded in a dynamic setting*. When developing business models for and on electronic markets, the notion of two-sided markets implies an interaction of the intermediary’s business model and the business models of the various market sides. As platform-based business models, successful electronic marketplaces will require a sustainable fit among these individual business models, which becomes apparent in positive network externalities. However, it is challenging to directly design these effects during business model development. This may be illustrated by literature on ecosystem management, which has emerged from the natural sciences (e.g. Lackey 1998; Briscoe et al. 2011) and has been used to conceptualize digital platforms such as electronic markets (e.g. Hein et al. 2020). Although further higher-level design layers (e.g. policy makers, user communities) (e.g. Tsujimoto et al. 2018), ecosystem canvases (Pettersson 2020) and ecosystem-oriented architectures (an extension of service-oriented architecture) were suggested (see Briscoe et al. 2011), developing ecosystems is rather challenging due to their specific characteristics. These are commonly summarized as self-organization, emergence, co-evolution and adaptation (Peltoniemi and Vuori 2004). They suggest that much of an ecosystem’s behavior results from the continuous interaction of multiple actors, which as a whole are not amenable to being directly designed by any single party. Nevertheless, developers of electronic

markets could aim at assessing how the business model behaves in the larger ecosystem setting as well as in the more encompassing environment (see left in Fig. 1). In addition to researching the rather static typologies and characteristics of business models (for an overview on business model elements see Wirtz et al. 2016), the dynamic setting recognizes the interaction between business models, their ecosystem(s) and their environment. For sure, models that grasp this embeddedness will be challenging and far from perfect. However, structuring these design aspects and assessing them qualitatively could contribute to an improved understanding of the complex dependencies in a larger setting. In addition, quantitative data from operational electronic market systems could be used to feed dynamic models, which are known in the field of simulation. Similar to previous suggestions in this direction (e.g. Lackey 1998; Li et al. 2012), the guest editors of the present special issue on business model tooling point in the same direction with reference to research in system dynamics (Bouwman et al. 2020).

Third, the *business models of electronic markets are digitally enabled*. As mentioned above, this avenue for business model development has a dual meaning. On the one hand, “electronic” implies a strong technological component that needs to be addressed during business model development. While this fact refers to the various (static) design elements of a business model, the digitalization of the development process itself is possible on the other hand. In this respect, business model development is often separated from the software development process and software development from productive operation. For example, Seidenstricker et al. (2014, p. 105) conceive business model development to

consist of three steps: (1) the definition of aim and identification of potential fields, (2) the generation of ideas for new business models, and (3) the assessment of business model ideas. Although these tasks are key in the early ideation phase, they exclude the subsequent phases (see right in Fig. 1) in software development and testing (D&T), integration and delivery (I&D) and deployment and operations (D&O). Thus, a stronger link between business model research and approaches in these later phases could be valuable to quickly realize mockups for innovation workshops (e.g. with design thinking methodologies), early ramp-up-activities with future partners and users of the electronic market as well as minimum viable products (MVP) in the deployment phase. These activities taking place prior to the releases in the operations phase seem of particular relevance since a successful adoption in the operations phase is key for achieving (positive) network effects. Developments in this direction may be observed in the fields of IT management and (agile) software engineering where Devops approaches aim at creating a close collaboration among development and operations. In particular, the CAMS principle (culture, automation, measurement, sharing) could be extended to also include the requirements of the ideation phase. Following this idea, a business modeling pipeline could enable innovation as an ongoing activity consisting of fundamental as well as gradual improvements. It could benefit developers in all stages by combing various existing tools from software, process and value modeling to largely automate well-formalized activities (e.g. in development, testing and deployment) and by providing support for activities with less formalization and higher creative elements (e.g. the discussion of quickly available mockups and prototypes in design thinking sessions). A business model development pipeline could be an extension of prior business model development frameworks (e.g. Ebel et al. 2016), existing delivery pipelines in the Devops area (e.g. Alt et al. 2019) and initiatives like on-the-fly computing (Karl et al. 2019). The latter “refers to the approach of providing complex IT services through largely automated configuration and execution [...] by different software providers and traded in a market” (Karl et al. 2019). Electronic markets could provide the platform for enabling service compositions that may be changed at runtime to match user requirements without requiring deep programming skills on behalf of the users.

To summarize, the grown relevance of (digital) business models has also spurred research that aims at developing business models. Although such tools will be unable to guarantee a business model’s success in advance, they are considered helpful in addressing the intricacies of business models as mentioned above. In the technological dimension, they could ensure that digitalization potentials are included from scratch and that tools like a flexibly configurable development pipeline (i.e. allowing the use of various tools in parallel or sequentially) increase the speed of bringing a new or updated

business model to the market. This might be similar to the development of a new vaccine, where identifying the vaccine’s (side) effects will not be possible by calculation, but only by testing with many probands. Understanding the contingencies involved in a business model’s development will also benefit from early tests among the business model’s intended users. Tools could on the one hand involve users early on in testing and generate data for business model simulations on the other. To leverage such automation potentials, formalization was mentioned as an important prerequisite. In this respect, tools that help to make the elements of agile process and software development (e.g. user processes, business process models, epics and user stories) available in repositories and configurators as well as combining them with business model elements could prove beneficial. It is apparent that design-oriented research methodologies (vom Brocke and Maedche 2019) are suitable for constantly inventing the future and that academics should also aim at closely collaborating with practitioners.

## Articles of present issue

The present special issue on business model tooling is the first in *Electronic Markets* on this topic and addresses some of the three issues raised above. It comprises four research papers, which are introduced in the preface of the four guest editors Harry Bouwman, Mark de Reuver, Marikka Heikkilä and Erwin Fiel. They conceive business model (BM) tooling as “a research area in itself” that “makes BM practically usable, while going beyond templates or canvases based on BM ontologies” and present an overview on current research topics as well as open research questions in the field of BM tooling (Bouwman et al. 2020). Among the topics addressed in the preface and the four research articles are architectures and typologies (see area 1 in Fig. 1) as well as analyses of a broad variety of BM tools that might be seen as a contribution to understanding future business model development pipelines (see area 3 in Fig. 1). Together with the research methodologies that include action research and case studies, the hope is that this special issue advances business modeling in academia and in practice. Many thanks go to the team of guest editors for organizing this collection of articles as well as to the authors who shared their exciting research and the reviewers who dedicated much of their time in several rounds of revision.

In addition to the special theme on business model tooling, the present issue also comprises nine papers in the general research section. The first set of four papers may also be positioned in the wider context of the special issue and contribute to understanding the business model of two-sided platforms, hereby connecting to a prior special issue on multi-sided platforms (Abdelkafi et al. 2019).. The first paper aims to practically apply business models and features a framework that supports

the selection of the “best” business model based on a set of twelve criteria based on the analytic network process method. The authors Kwanyoung Im, Kihwan Nam and Hyunbo Cho combine these results with a portfolio matrix to show how the various business model alternatives compare to each other (Im et al. 2020). A case study from a Korean telecommunications company illustrates this innovative approach. The following three papers may be seen as contributions to the dynamics of digital ecosystems as mentioned in area 2 of Fig. 1:

- The evolution of a digital platform is shown in a case study, which reports the transformation of the electronic identification (eID) ecosystem in Finland. The authors Anar Bazarhanova, Jesse Yli-Huumo and Kari Smolander recognize the sociotechnical nature of digital platforms and analyze the compelling evolution of the eID platform from a rather centralized to a more federated form of governance (Bazarhanova et al. 2020). They observe that this shift leads to a weakened position of the platform owner, which was not intended and thus reflects the ecosystem characteristics mentioned above.
- The “chicken-and-egg problem” is a well-known challenge in the early phases of a platform. Jørgen Veisdal investigates this phenomenon in ten startups and derives (success) factors, which shed new light on why adoption was successful in two-sided markets. Among the recommendations are to well gauge the expectations in accordance with the intended participants, to well estimate the demand on both market sides and to also consider the quality of supply besides the (sheer) number of suppliers (Veisdal 2020).
- Another solution to the “chicken-and-egg problem” is presented for decentralized environments based on blockchain technology. Benedict J. Drasch, Gilbert Fridgen, Tobias Manner-Romberg, Fenja M. Nolting and Sven Radszuwill describe that utility tokens are useful in providing value already in the early development phases of two-sided platforms. For this purpose, the authors modeled a blockchain-based platform to analyze the token value in the phases of platform development and platform operation (Drasch et al. 2020).

The second cluster of general research papers addresses questions of privacy in digital platforms. The first is authored by the team of Johannes Klumpe, Oliver Francis Koch and Alexander Benlian, who compare the differences in information disclosure with electronic services (or apps) that either allow users to control their geolocation data or that require an always-on location tracking (Klumpe et al. 2020). They derive three findings, whereas users favor services where they can exert control and services that enjoy a certain popularity, but that certain conditions may also override privacy concerns. The fact that data-based value chains (e.g. relying on

IoT, big data and cloud computing) inherently contain IT security risks is analyzed in the next paper, which was authored by Laura Bitomsky, Olga Bürger, Björn Häckel and Jannick Töppel. They propose a modeling approach that matches value activities with data types and IT security risks (Bitomsky et al. 2020). The research highlights that even data types with seemingly little value such as IT data bear significant risks in IT security.

In contrast to the goal of safeguarding a high security of data on behalf of businesses, regulations like the EU General Data Protection Regulation aim at increasing the transparency of data for users. In their online experiment shop.io Jan Hendrik Betzing, Matthias Tietz, Jan vom Brocke and Jörg Becker investigate the impact of this transparency on mobile privacy decision making with over 300 participants. Based on their analysis, they formulate six principles that support service providers “to design privacy-transparent mobile apps” (Betzing et al. 2020). Another research on privacy in the domain of e-commerce is presented in the paper of Ruwan Bandara, Mario Fernando and Shahriar Akter. They acknowledge that new technologies, such as big data, artificial intelligence, virtual assistants or blockchain systems have fundamentally changed the privacy dynamics in e-commerce. The authors systematically summarize the state-of-the-art based on a literature analysis and consolidate their observations in eight themes and “a taxonomy of privacy” (Bandara et al. 2020). Together with their research avenues this might prove helpful for guiding future work in this direction. Finally, Eva-Maria Schomakers, Chantal Lidynia and Martina Ziefle report how privacy-preserving data markets that were already discussed in a special issue of Electronic Markets back in 2015 contribute in restoring user’s online privacy and self-determination (Schomakers et al. 2020).

## Editorial board meeting

This issue also provides an opportunity to briefly report about this year’s meeting of Electronic Markets’ editorial board. Due to the pandemic situation and the virtualization of the ECIS conference in Marrakesh, the meeting itself experienced a digital transformation. It prevented a face-to-face meeting at the conference location, but allowed for more board members to participate. In sum, it was Electronic Markets’ largest board meeting with almost 40 participants and nevertheless led to lively discussions concerning upcoming topics and the onboarding of young researchers as authors as well as potential board members. The latter seems vital for a journal since esteemed colleagues and valuable supporters on the Electronic Markets board regularly terminate their service. This year, the appreciation goes to Mary Cronin from Boston College, Niels Bjørn-Anderson from Copenhagen Business School, and Catherine A. Dwyer from Pace University, who have served

for a long time on the Electronic Markets board. At the same time, we are honored that several colleagues have accepted the invitation to join as members of the editorial board or as associate editors. We welcome Fábio Lobato from the Federal University of Western Pará, Jianwei Hou from Minnesota State University Mankato as well as Christine Legner from the University of Lausanne as new associate editors and Roger Bons from FOM University of Applied Sciences, Juho Lindman from the University of Gothenburg, and Efosa Carroll Idemudia from the Kennesaw State University as new members of the editorial board. Last but not least, M. Lynne Markus from Bentley University has agreed to join the Advisory Board. Many thanks to all of them as well as to all who participated in this issue. We hope recognize this dedication and enjoy reading this issue.

Your EM team.

**Funding** Open Access funding provided by Projekt DEAL.

**Open Access** This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by/4.0/>.

## References

- Abdelkafi, N., Raasch, C., Roth, A., & Srinivasan, R. (2019). Multi-sided platforms. *Electronic Markets*, 29(4), 553–559. <https://doi.org/10.1007/s12525-019-00385-4>.
- Alt, R. (2019). Electronic Markets on digital transformation methodologies. *Electronic Markets*, 29(4), 307–313. <https://doi.org/10.1007/s12525-019-00370-x>.
- Alt, R., Auth, G., & Kögler, C. (2019). Transformation of consulting for software-defined businesses: Lessons from a DevOps case study in a German IT company. In Nissen, V. (ed.), *Advances in consulting research. Contributions to management science*. (pp. 385–403). Springer, Cham. [https://doi.org/10.1007/978-3-319-95999-3\\_19](https://doi.org/10.1007/978-3-319-95999-3_19).
- Alt, R., & Zimmermann, H.-D. (2014). Editorial 24/4: Electronic markets and business models. *Electronic Markets*, 24(4), 231–234. <https://doi.org/10.1007/s12525-014-0178-2>.
- Bandara, R., Fernando, M., & Akter, S. (2020). Privacy concerns in E-commerce: A taxonomy and a future research agenda. *Electronic Markets*, 30(3). <https://doi.org/10.1007/s12525-019-00375-6>.
- Bazarhanova, A., Yli-Huumo, J., & Smolander, K. (2020). From platform dominance to weakened ownership: How external regulation changed Finnish e-identification. *Electronic Markets*, 30(3). <https://doi.org/10.1007/s12525-019-00331-4>.
- Betzing, J. H., Tietz, M., & vom Brocke, J., & Becker, J. (2020). The impact of transparency on mobile privacy decision making. *Electronic Markets*, 30(3). <https://doi.org/10.1007/s12525-019-00332-3>.
- Bitomsky, L., Bürger, O., Häckel, B., & Töppel, J. (2020). Value of data meets IT security - assessing IT security risks in data-driven value chains. *Electronic Markets*, 30(3). <https://doi.org/10.1007/s12525-019-00383-6>.
- Bouwman, H., de Reuver, M., Heikkilä, M., & Fiel, E. (2020). Business model tooling: Where research and practice meet. *Electronic Markets*, 30(3). <https://doi.org/10.1007/s12525-020-00424-5>.
- Briscoe, G., Sadedin, S., & de Wilde, P. (2011). Digital ecosystems: Ecosystem-oriented architectures. *Natural Computing*, 10(3), 1143–1194. <https://doi.org/10.1007/s11047-011-9254-0>.
- Cennamo, C. (2019). Competing in digital markets: A platform-based perspective. *Academy of Management Perspective*. <https://doi.org/10.5465/amp.2016.0048>.
- Chelariu, C., & Sangtani, V. (2009). Relational governance in B2B electronic marketplaces: An updated typology. *Journal of Business & Industrial Marketing*, 24(2), 108–118. <https://doi.org/10.1108/08858620910931721>.
- Costa, C. C., & Cunha, P. (2015). The social dimension of business models: An actor-network theory perspective. *Proceedings 21<sup>st</sup> Americas conference on information systems, Puerto Rico*.
- de Reuver, M., Sørensen, C., & Basole, R. C. (2018). The digital platform: A research agenda. *Journal of Information Technology*, 33(2), 124–135. <https://doi.org/10.1057/s41265-016-0033-3>.
- Drasch, B. J., Fridgen, G., Manner-Romberg, T., Nolting, F. M., & Radszuwil, S. (2020). The token's secret: The two-faced financial incentive of the token economy. *Electronic Markets*, 30(3). <https://doi.org/10.1007/s12525-020-00412-9>.
- Ebel, P., Bretschneider, U., & Leimeister, J. M. (2016). Leveraging virtual business model innovation: A framework for designing business model development tools. *Information Systems Journal*, 26(5), 519–550. <https://doi.org/10.1111/isj.12103>.
- Eisenmann, T., Parker, G., & Van Alstyne, M. W. (2006). Strategies for two-sided markets. *Harvard Business Review*, 84(10), 92–101.
- Grieger, M. (2003). Electronic marketplaces: A literature review and a call for supply chain management research. *European Journal of Operations Research*, 144(2), 280–294. [https://doi.org/10.1016/S0377-2217\(02\)00394-6](https://doi.org/10.1016/S0377-2217(02)00394-6).
- Hein, A., Schrieck, M., Riasanow, T., Soto Setzke, D., Wiesche, M., Böhm, M., & Krcmar, H. (2020). Digital platform ecosystems. *Electronic Markets*, 30(1), 87–98. <https://doi.org/10.1007/s12525-019-00377-4>.
- Im, K., Nam, K., & Cho, H. (2020). Towards successful business model management with analytic network process-based feasibility evaluation and portfolio management. *Electronic Markets*, 30(3). <https://doi.org/10.1007/s12525-020-00427-2>.
- Ives, B., & Learmonth, G. P. (1984). The information system as a competitive weapon. *Communications of the ACM*, 27(12), 1193–1201. <https://doi.org/10.1145/2135.2137>.
- Kaplan, S., & Sawhney, M. (2000). E-hubs: The new B2B marketplaces. *Harvard Business Review*, 78(3), 97–103.
- Karl, H., Kundisch, D., Meyer Auf Der Heide, F., & Wehrheim, H. (2019). A case for a new IT ecosystem: On-the-Fly computing. *Business & Information Systems Engineering*. <https://doi.org/10.1007/s12599-019-00627-x>.
- Klumpe, J., Koch, O. F., & Benlian, A. (2020). How pull vs. push information delivery and social proof affect information disclosure in location based services. *Electronic Markets*, 30(3). <https://doi.org/10.1007/s12525-018-0318-1>.
- Kouris, I., & Kleer, R. (2012). Business models in two-sided markets: An assessment of strategies for app platforms. *Proceedings 2012 International Conference on Mobile Business (ICMB)*. <http://aisel.aisnet.org/icmb2012/22>.

- Lackey, R. T. (1998). Seven pillars of ecosystem management. *Landscape and Urban Planning*, 40(1–3), 21–30. [https://doi.org/10.1016/S0169-2046\(97\)00095-9](https://doi.org/10.1016/S0169-2046(97)00095-9).
- Li, W., Badr, Y., & Biennier, F. (2012). Digital ecosystems: Challenges and prospects. In proceedings international conference on Management of Emergent Digital EcoSystems (MEDES '12), ACM, New York, NY, pp. 117–122. <https://doi.org/10.1145/2457276.2457297>.
- Magretta, J. (2002). Why Business Models Matter. *Harvard Business Review*, 80(5), 86–92.
- Nielsen, C., & Lund, M. (2014). A Brief History of the Business Model Concept. In *The Basics of Business Models*. pp. 21–27. Ventus. <http://bookboon.com/en/the-basics-of-business-models-ebook>
- Peltoniemi, M., & Vuori, E. (2004). Business ecosystem as the new approach to complex adaptive business environments. In Seppä, M., Hannula, M., Järvelin, A., Kujala, J., Ruohonen, M., & Tiainen, T. (Eds.). *FeBR 2004: Frontiers of e-business research 2004*. pp. 267–281. Proceedings of eBRF 2004, Tampere.
- Petersen, K.J., Ogden, J.A., & Carter, P.L. (2007). B2B e-marketplaces: A typology by functionality. *International journal of physical distribution & logistics management*, 37(1)1, 4–18. <https://doi.org/10.1108/09600030710723291>.
- Pettersson, A. (2020). *Framework for strategising in business ecosystems* [Master's thesis, Åbo Akademi University]. Turku. <http://urn.fi/URN:NBN:fi-fe202003279559>.
- Rensmann, B. (2012). Towards a typology of retail cybermediation in tourism markets. In M. Fuchs, F. Ricci, & L. Cantoni (Eds.), *Information and communication Technologies in Tourism 2012*. pp. 344–355. Wien/New York: Springer. [https://doi.org/10.1007/978-3-7091-1142-0\\_30](https://doi.org/10.1007/978-3-7091-1142-0_30).
- Riasanow, T., Jäntgen, L., Hermes, S., Böhm, M., & Krcmar, H. (2020). Core, intertwined, and ecosystem-specific clusters in platform ecosystems: Analyzing similarities in the digital transformation of the automotive, blockchain, financial, insurance and IIoT industry. *Electronic Markets*. <https://doi.org/10.1007/s12525-020-00407-6>.
- Rückeshäuser, N. (2017). Typology of distributed ledger based business models. *Proceedings 25<sup>th</sup> European conference on information systems (ECIS)*, Guimarães, 2202–2217. [http://aisel.aisnet.org/ecis2017\\_rp/140](http://aisel.aisnet.org/ecis2017_rp/140).
- Schmid, B.F., & Lindemann, M.A. (1998). Elements of a reference model for electronic markets. *Proceedings 31<sup>st</sup> Hawaii international conference on system sciences*, IEEE Xplore. <https://doi.org/10.1109/HICSS.1998.655275>.
- Schomakers, E., Lidynia, C., & Ziefle, M. (2020). All of me? Users' preferences for privacy-preserving data markets and the importance of anonymity. *Electronic Markets*, 30(3). <https://doi.org/10.1007/s12525-020-00404-9>.
- Seidenstricker, S., Scheuerle, S., & Linder, C. (2014). Business model prototyping - using the morphological analysis to develop new business models. *Procedia - Social and Behavioral Sciences*, 148, 102–109. <https://doi.org/10.1016/j.sbspro.2014.07.023>.
- Täuscher, K., & Laudien, S. M. (2018). Understanding platform business models: A mixed methods study of marketplaces. *European Management Journal*, 36(3), 219–329. <https://doi.org/10.1016/j.emj.2017.06.005>.
- Timmers, P. (1998). Business models for electronic commerce. *Electronic Markets*, 8(2), 3–8. <https://doi.org/10.1080/10196789800000016>.
- Tsujimoto, M., Kajikawa, Y., Tomita, J., & Matsumoto, Y. (2018). A review of the ecosystem concept - towards coherent ecosystem design. *Technological Forecasting and Social Change*, 136, 49–58. <https://doi.org/10.1016/j.techfore.2017.06.032>.
- Veisdal, J. (2020). The dynamics of entry for digital platforms in two-sided markets: A multi-case study. *Electronic Markets*, 30(3). <https://doi.org/10.1007/s12525-020-00409-4>.
- Veit, D., Clemons, E., Benlian, A., Buxmann, P., Hess, T., Spann, M., Kundisch, D., Leimeister, J. M., & Loos, P. (2014). Business models: An information systems research agenda. *Business & Information Systems Engineering*, 6(1), 45–53. <https://doi.org/10.1007/s12599-013-0308-y>.
- Venkatraman, N. (1994). IT-enabled business transformation: From automation to business scope redefinition. *Sloan Management Review*, 35(2), 73–87.
- vom Brocke, J., & Maedche, A. (2019). The DSR grid: Six core dimensions for effectively planning and communicating design science research projects. *Electronic Markets*, 29(3), 379–385. <https://doi.org/10.1007/s12525-019-00358-7>.
- Wigand, R. T. (1997). Electronic commerce: Definition, theory, and context. *The Information Society*, 13(1), 1–16. <https://doi.org/10.1080/019722497129241>.
- Wirtz, B. W., Pistoia, A., Ullrich, S., & Göttel, V. (2016). Business models: Origin, development and future research. *Long Range Planning*, 49(1), 36–54. <https://doi.org/10.1016/j.lrp.2015.04.001>.
- Wiseman, C. M. (1985). *Strategy and computers: Information systems as competitive weapons*. Homewood (IL): Irwin.
- Zutshi, A., & Grilo, A. (2019). The emergence of digital platforms: A conceptual platform architecture and impact on industrial engineering. *Computers & Industrial Engineering*, 136, 546–555. <https://doi.org/10.1016/j.cie.2019.07.027>.

**Publisher's note** Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.