

Wulfert, Tobias; Woroch, Robert; Strobel, Gero; Schoormann, Thorsten; Banh, Leonardo

Article — Published Version

E-commerce ecosystems as catalysts for sustainability: A multi-case analysis

Electronic Markets

Provided in Cooperation with:

Springer Nature

Suggested Citation: Wulfert, Tobias; Woroch, Robert; Strobel, Gero; Schoormann, Thorsten; Banh, Leonardo (2024) : E-commerce ecosystems as catalysts for sustainability: A multi-case analysis, Electronic Markets, ISSN 1422-8890, Springer, Berlin, Heidelberg, Vol. 34, Iss. 1, <https://doi.org/10.1007/s12525-024-00733-z>

This Version is available at:

<https://hdl.handle.net/10419/315706>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.



<http://creativecommons.org/licenses/by/4.0/>



E-commerce ecosystems as catalysts for sustainability: A multi-case analysis

Tobias Wulfert¹ · Robert Woroch¹ · Gero Strobel¹ · Thorsten Schoormann^{2,3} · Leonardo Banh¹

Received: 11 February 2024 / Accepted: 9 September 2024 / Published online: 18 November 2024
© The Author(s) 2024

Abstract

Single organizations encounter intricate challenges in meeting the UN's Sustainable Development Goals (SDGs) on their own and thus are increasingly concerned with forming ecosystems. This is also the case in the e-commerce domain. It is assumed that particularly focal actors of such ecosystems have the power to foster initiatives towards more sustainability. We conducted an embedded multi-case study with 135 initiatives collected from three types of e-commerce ecosystems to uncover what sustainability goals are addressed by different ecosystem participants. This paper's analysis explores (1) what sustainability initiatives are reported from focal actors and differences depending on a specific type of ecosystem, (2) dependencies between SDGs within the initiatives, and (3) the degree of involvement of other ecosystem actors and how they contribute to certain SDGs. Our work synthesizes existing initiatives towards sustainable development to give orientation and impulses for practice and academia as well as outlines avenues for future research at the intersection of ecosystems and sustainability.

Keywords E-commerce · Ecosystem · Digital platform · Sustainable development · Case study

JEL classification M14 · Q5

Introduction

The world faces a series of natural and societal issues demanding urgent action across almost all areas of life, as illustrated by the Sustainable Development Goals (SDGs) (United Nations 2021). The business sector plays a pivotal role in implementing and advancing sustainability (Schaltegger et al. 2012). As the transition towards more sustainability is a multidimensional task that extends beyond organizational boundaries (Brundtland et al. 1987; Santos and Eisenhardt 2005; Schoormann et al. 2022), companies have started to join forces (Popp et al. 2014) in the form of ecosystems

(Adner 2017). Ecosystems are often governed by one or a few focal actors (Gawer and Cusumano 2008, 2014) and have already been proven to be capable of managing grand challenges (Moore 1993, 1996). Especially digital business ecosystems (i.e., networks of companies applying digital technologies) are auspicious to address the SDGs because they are able to accelerate transformative change and solve complex social problems (Alt 2020; Jha et al. 2016), exploit and monitor data from supply chains (Liu et al. 2015; Popp et al. 2014), and spark substantial innovations (Wang et al. 2021).

Among the different types of ecosystems, *e-commerce ecosystems* have gained particular attention over the last few years. Boosted by global events, such as the COVID-19 pandemic, the revenues of e-commerce are expected to reach US\$7.9 trillion by 2027 (eMarketer 2024). Their economic importance is evident by facts such as that Amazon generated a large proportion of its revenues from commission fees of third-party sellers within its ecosystem accounting for up to 60% of physical gross merchandise sales (Amazon 2019a, 2021a). Also, these ecosystems and the retail sector in general have the potential to respond to changing customer demands and new regulations concerning sustainability (Auf

Responsible Editor: Shengnan Han

✉ Tobias Wulfert
tobias.wulfert@icb.uni-due.de

¹ University of Duisburg-Essen, Universitätsstraße 2, Essen 45141, Germany

² TU Braunschweig, Abt-Jerusalem-Straße 7, Braunschweig 38092, Germany

³ Fraunhofer ISST, Speicherstraße 6, Dortmund 44147, Germany

der Landwehr et al. 2023) because of their direct interaction with numerous actors and their involvement in worldwide supply chains (Mangiaracina et al. 2015; Rao et al. 2021). This is supported by prior research that emphasizes positive impacts, including more environmentally friendly alternatives for online goods (Auf der Landwehr et al. 2023; Revinova 2021) and the empowerment of rural communities through social development and economic value creation (e.g., Leong et al. 2016; Tim et al. 2021). The focal role of sellers in ecosystems enables them, for instance, to force suppliers to implement carbon dioxide indicators (Otto 2011), create awareness of food waste (Lemaire & Limbourg, 2019), and reduce environmental pollution by creating closed-loop systems (Schroeder et al. 2019).

Retailers are generally considered focal participants in e-commerce ecosystems. They provide the platform¹ as well as act as gatekeepers and intermediaries between manufacturers, customers, and additional stakeholders (Wulfert and Karger 2022). While retailers can foster the achievement of SDGs and a majority of them aim to run corresponding initiatives (Jones and Comfort 2019), they encounter challenges concerning the implementation (Jones and Comfort 2021). Although several approaches for establishing software platforms and platform-centered ecosystems have been proposed (Evans and Schmalensee 2016; Parker et al. 2016; Parker and van Alstyne 2016; Reillier and Reillier 2017; Schirmacher et al. 2017), the diverse aspects of sustainability need to be considered in greater detail to provide impulses for retailers and other ecosystem developers. Given the power of e-commerce ecosystems (e.g., Jones and Comfort 2021; Lehner 2015; Ruiz-Real et al. 2019; SanMiguel et al. 2021), we sought to uncover current initiatives towards sustainable development. Therefore, we ask: *What are sustainability-oriented initiatives from e-commerce ecosystems and their contributing actors?*

In attempting to advance our understanding of ecosystems and societal problems (Jha et al. 2016), we analyzed three e-commerce ecosystem cases (i.e., Amazon Marketplace, Etsy, and Walmart Marketplace) by applying Yin's (2018) embedded multi-case study approach. The cases were chosen to represent various approaches to implementing ecosystem models, ranging from purely digital (Amazon) to hybrid models with a physical foundation and digital expansion (Walmart), as well as specialized assortments (Etsy). This selection ensures a comprehensive overview of different business endeavors. Our work's contribution is threefold: First, we provide insights of initiatives from

an ecosystem-specific perspective by describing the case's contributions to the SDGs (see "[Ecosystem-specific contribution to sustainability from marketplace owners](#)" section). Based on 135 initiatives collected from sustainability reports of focal companies, their relationships to the SDGs could be examined. This is intended to serve as a source of inspiration and aids practitioners in navigating through existing initiatives for boosting sustainability in general and from an ecosystem-specific perspective (see "[Analysis of the initiatives from marketplace owners](#)" section). For practitioners and policymakers, the overview emphasizes the essential role of (e-commerce) ecosystems in addressing the UN's SDGs. Second, we explored dependencies between the SDGs to disclose which SDGs typically occur together and inform decision-making when it comes to planning sustainability initiatives (see "[Dependencies between sustainability goals within the initiatives from marketplace owners](#)" section). Third, we show the degree of involvement of different ecosystem participants in such initiatives by analyzing their connections to each other (see "[Ecosystem participants involved in initiatives from marketplace owners](#)" section) and comparing their share of contributing to certain SDGs (see "[Comparison of results to initiatives of complementary companies](#)" section). This paves the ground for theorizing dependencies between the ecosystem participants and their ability to contribute to certain SDGs.

The remainder of this paper is organized as follows: In the next section, we introduce sustainable development, and e-commerce ecosystems, and outline related work. By following our research approach, involving a multi-case study analyzing sustainability reports, we then provide insights from the analysis of sustainability initiatives promoted by owners of focal platforms in e-commerce ecosystems and involved participants. Afterward, we discuss our results and their implications for research and practice. Finally, we conclude with the paper.

Research background

Sustainability and its conceptualization

Sustainability falls within the class of complex or even wicked problems (Buchanan 1992) in which possible conflicting trade-offs between economic, environmental, and social concerns need to be reflected. For instance, issues with regard to mitigating climate change (Howard-Grenville et al. 2014), managing natural resources (George et al. 2015), and ensuring gender equality (Joshi et al. 2015). As the sustainability concept is very broad (Malhotra et al. 2013), it can be analyzed through a multiplicity of possible lenses, such as stakeholder theory by Parmar et al. (2010) or resource-based view by Barney (2001). We particularly draw

¹ We use the terms transaction platform and digital marketplace as the center of e-commerce ecosystems interchangeably in this paper. As the platform forms the center of these ecosystems, its owner can exert influence on the other ecosystem participants mentioned.

on the categorization of the SDGs (United Nations 2015) to underpin our research. The SDGs are introduced as part of the UN's Agenda 2030 which features 17 goals to capture a shared blueprint for peace and prosperity for people and the planet. We use the SDGs because they are among the prevailing conceptualizations for sustainability and allow for a nuanced investigation of the initiatives of e-commerce ecosystems due to their broad coverage.

Although specifying a series of goals is important to navigate toward more sustainable entities, there is a need to investigate how to implement them. The information systems (IS) discipline (e.g., Ketter et al. 2023; Seidel et al. 2011; Zeiss et al. 2021) therefore calls for more action to go beyond the belief formulation and awareness phase (Melville 2010). The idea of building ecosystems in which organizations jointly pursue a shared purpose poses great leverage for economic but also environmental and social goals (Wang et al. 2021, p. 397), for which reason this paper focuses on which actions (i.e., initiatives) of such systems are conducted to promote sustainability.

E-commerce ecosystems

E-commerce ecosystems can be positioned as digital business ecosystems centered around a focal platform in the context of e-commerce. Following their digital nature, retail transactions among actors involving digital and physical products in those systems are conducted via digital means (Choi et al. 1997; Holsapple and Singh 2000; Wulfert et al. 2022; Yi and Ming 2011). Informed by organizational boundary theory (Santos and Eisenhardt 2005; Teece 2007; Tsujimoto et al. 2018), such ecosystems are dynamic concerning actors, product assortment, and leaders, as well as have fuzzy boundaries (Gao et al. 2019; Kawa and Waleziak 2019; Moore 1996; Teller and Elms 2010). They are complex networks of platform-mediated actor-to-actor interactions in which independent participants are linked by shared goals (Adner 2017; Corallo 2007; Wareham et al. 2014). These focal transaction platforms aid in matching and orchestrating organizations and individual participants from various markets and social groups to form an ecosystem (Corallo et al. 2007; Gawer 2021). A variety of retail-related services are offered (Wulfert et al. 2021), and those platforms are increasingly concerned with enabling innovation and the attraction of external developers as complementary parts of the ecosystem (Wulfert et al. 2021).

Formed by independent and even competing participants (natural or legal entities) (Corallo et al. 2007; McIntyre and Srinivasan 2017; Wareham et al. 2014), e-commerce ecosystems can co-create value (Blaschke and Brosius 2018; Vargo et al. 2008) while simultaneously competing for resources (Corallo et al. 2007). Eisenmann et al. (2009) introduced “supply-side participants,” “demand-side participants,” the

“platform provider,” and the “platform sponsor” as archetypal actors. Iansiti and Levien (2004) identified a focal participant that controls the ecosystem and several niche participants, also called “keystone firm” (Iansiti and Levien 2004), “hub firm” (Nambisan 2013), “platform leader” (Gawer and Cusumano 2008, 2014), or “platform owner” (Baldwin and Woodard 2009). This paper's analysis primarily addresses the *owner of a focal digital marketplace* in an e-commerce ecosystem and actions employed to lead, control, and influence other participants. The owner of the focal platform sets and enforces governance rules, such as those concerning sustainability (Adner 2017).

Moreover, to capture other typical ecosystem actors, this paper examines e-commerce ecosystem participants drawing on Eisenmann et al.'s (2009) archetypal roles in multisided platforms and recent research in e-commerce ecosystems (Wulfert et al. 2023). These types of participants identified in marketplace owners' sustainability reports are potentially impacted by sustainability initiatives promoted by the focal platform owner as well as can actively contribute to the sustainable goals by themselves (see Table 1).

Related work and research objectives

Enabled by digital technologies, ecosystems “can spawn countless innovations of substantial social and economic value” (Wang et al. 2021, p. 397). Besides an ecosystem's power to explain economic maxims, they provide auspicious lenses to move towards sustainability (Hoppe et al. 2023; Wood et al. 2018), for illustration, by adopting circularity to reduce waste or by establishing co-creation approaches to offer personalized goods and services while tackling environmental challenges. Following the nuanced goals of ecosystems, Sasaki (2018) examined ecosystem types by conducting a word cluster analysis of 391 papers. Among the five clusters, *sustainable ecosystems* (e.g., environmental, impact) and *social ecosystems* (e.g., human, ethics, responsibility) were extracted that point to the different foci pursued by a type. This is in line with our review of prior literature on ecosystems and sustainability, which discloses a broad range of potentials. From a societal viewpoint, prior research covers topics, such as supporting farmers and fighting poverty in rural areas (e.g., Jha et al. 2016; McRae et al. 2022), creating alternative food networks (Trieu and Lin 2021), increasing citizen participation (Ju et al. 2018), and improving healthcare infrastructure (Llamzon et al. 2020). Environmental values include improving the efficiency of energy consumption (Keller et al. 2019).

Referring to our context of e-commerce ecosystems—as one of the dominant types of ecosystems that have enormous effects on people and businesses (Auf der Landwehr et al. 2023)—prior literature has already stressed their relevance for different facets of sustainability. For instance, Leong

Table 1 Ecosystem participant types and examples

Role	Description and potential	Example	Sources
Marketplace owner	... orchestrates electronic transactions between sellers and customers and implements strategic instruments to influence e-commerce ecosystem participants (<i>sustainable strategy decisions and actor selection</i>)	Amazon, Etsy, Walmart	Boudreau and Hagiu (2009), Hagiu and Wright (2015), Kawa and Walesiak (2019), (Wulfert et al. 2021)
Manufacturer	... provides an e-commerce ecosystem with products and services (<i>sustainable production and use of materials</i>)	Bosch, Microsoft, Anker, Spigen, Epson	Mishra and Tripathi (2020), Kaoud et al. (2020), Balachandran and Mohammadian (2015)
Seller	... resells products purchased from manufacturers to customers (<i>sustainable consumption</i>)	Bose, LEGO, AnkerDirect, Office Partner	Boudreau and Hagiu (2009), Choi et al. (1997), Timmers (1998), Zwass (1996)
Consumer	... demands and purchases of products and services from demand-side participants (<i>sustainable consumption</i>)	n.a.	Lee et al. (2019), Turban et al. (2017)
Service provider	... supports transactions in e-commerce ecosystems. Exemplary service providers offer payment, content, and logistics services (<i>sustainable transportation</i>)	DHL, Hermes, FedEx, Mastercard, rockitdigital	Abbu et al. (2021), Han et al. (2020), Deufel and Kemper (2018), Eickhoff et al. (2017), Kaoud et al. (2020), Yang et al. (2017)
IT provider	... provides the application and infrastructure services for conducting e-commerce transactions (<i>sustainable hardware, Green IT</i>)	Salesforce, Shopify, Cirrus, Pentagon	Aulkemeier et al. (2016), Eisenmann et al. (2009), Tiwana et al. (2010)
Developer	... develops extensions (e.g., shop themes, interfaces for other digital marketplaces, or feature add-ins) (<i>sustainable design, nudging</i>)	Remerge.io, VOLO, Tradebyte	Alami et al. (2015), Can and Yong-Quan (2014), Dowie et al. (2017), Ghazawneh and Henfridsson (2013)
Government	... defines the environment (e.g., antitrust law, taxes, innovation support) for domestic and international transactions in an e-commerce ecosystem (<i>sustainable regulations</i>)	US government, World Trade Organization	Aulkemeier et al. (2017), Kang (2021), Satariano (2020), Tian et al. (2018)
Investor	... provides the necessary monetary foundation such that e-commerce ecosystem participants can engage in production, transactions, and consumption (<i>sustainable investment</i>)	Vanguard Group, Advisor Group, BlackRock	Böttcher et al. (2021), Kwak et al. (2019)

et al. (2016) performed an in-depth case study of villages in China that are affected by Alibaba's e-commerce endeavors—one of the largest platforms in the world—and stressed positive consequences in terms of digitally empowering rather marginalized communities. These observations are supported by other scholars who analyzed data from the Taobao platform and pointed to empowerment and new opportunities for open innovation in rural communities (Peng et al. 2019), or disclosed that Alibaba's bigger vision is to “[create] a sustainable ecosystem for rural e-commerce” (Tim et al. 2021, p. 14) with impacts for inclusion, resilience, and sustainability. As digital infrastructure plays an important role, some studies focus on the technical side, for instance, Budiono et al. (2018) investigated how the adoption of cloud computing can contribute to e-commerce ecosystems, and Trieu and Lin (2021) focused on blockchain-based platforms for rural sustainability. Besides societal benefits, the economic perspective of e-commerce ecosystems is

emphasized, including increased economic performance (e.g., Peng et al. 2019) and new opportunities for entrepreneurial activities (e.g., Sitoh et al. 2014; Yue et al. 2016).

Contrarily, also negative consequences need to be considered. These include out-migration, environmental degradation (Leong et al. 2016), and packaging waste and increasing carbon emissions due to the logistics when operating e-commerce ecosystems (Yen & Wong 2019). More broadly, from a general ecosystem perspective, there is the risk of an imbalance between the ecosystem participants which may promote the “winner-takes-all” principles and thus results in unequal distribution of values (Wang et al. 2021).

Drawing on prior literature, we conclude that there is rich potential for e-commerce ecosystems to enable transformations towards more sustainable practices of individuals and organizations. To advance our understanding of how to employ the ecosystem concept, a holistic viewpoint covering several sustainability goals is required because this allows us

to be oriented on what is already out there (e.g., current initiatives that can be adapted), what should be reflected (e.g., risks from e-commerce), and what needs to be investigated.

Responding to calls for building resilient strategies that consider the organization's surrounding context (e.g., Taani and Faik 2019) and for shedding light on environmental issues of ecosystems (Sasaki 2018), this paper (1) provides an overview of sustainability initiatives from e-commerce ecosystems in general and from a more ecosystem-specific viewpoint (see "[Ecosystem-specific contribution to sustainability from marketplace owners](#)" section and "[Analysis of the initiatives from marketplace owners](#)" section), (2) shows relationships between SDGs in an initiative to improve effective planning of activities (see "[Dependencies between sustainability goals within the initiatives from marketplace owners](#)" section), and (3) analyzes which ecosystems participants are involved in such initiatives and the share of contributing to the SDGs ("[Ecosystem participants involved in initiatives from marketplace owners](#)" section and "[Comparison of results to initiatives of complementary companies](#)" section). With this, we aim to add a broad view of this phenomenon and extend the valuable knowledge base on (e-commerce) ecosystems through the analysis of real-world examples.

Research design

We followed the embedded multi-case study approach (Eisenhardt 1989; Yin 2018) to conceptualize sustainability initiatives taken by focal e-commerce ecosystem participants. This approach enabled us to derive initiatives from a series of cases that may differ in environmental aspects but share a common phenomenon (Yin 2018). Selecting multiple instances aids in extracting cross-case patterns and serves as the foundation for comparative analysis (Eisenhardt 1989; van Aken 2004). Thereby, we transcend the specificity of each case and abstracted more generalized knowledge for a broader class of solutions (Gregor et al. 2013; Lee et al. 2011).

Data sampling and collection

Following our overall goal to identify knowledge about e-commerce ecosystems and their impact on sustainability, we collected data on economically successful and globally operating e-commerce ecosystems². We applied a taxonomy describing focal transaction platforms in e-commerce (Wulfert et al. 2021) to select platforms and surrounding systems with different characteristics (i.e., Amazon, Etsy, Walmart). Amazon and Walmart offer a wide assortment with their adjacent sellers, have access to enormous customer bases, and behave competitively to third-party sellers in certain product areas

(Wulfert and Schütte 2022). Amazon allows limited transactions among customers (C2C), allows customers to review supply-side participants, and provides infrastructure services as additional services (i.e., Amazon Web Services). In contrast to Amazon, Walmart was founded as a chain of grocery stores with hundreds of brick-and-mortar stores in North America and a suitable fulfillment network (domestic). Walmart conducts a detailed investigation before allowing third-party sellers to access the platform. Etsy forms a global e-commerce ecosystem that focuses on hand-crafted goods as a niche. In terms of the platform business model applied, Etsy implemented pricing discovery, designed the platform access, and offered additional services (Wulfert et al. 2021). This selection of cases allowed us to extract and generalize insights into the involvement of ecosystem participants in marketplace owners' sustainability initiatives (Lee et al. 2011; Yin 2018). We chose these cases as "literal replications" of comparable specificities that complement each other and share a common phenomenon (i.e., platform business model) (Yin 2018). While the setting of each selected case was characterized by a high degree of business success on the global scale, our analysis examined how and by which participants' sustainability initiatives are addressed within these cases (see Table 2).

To determine the initiatives taken by e-commerce ecosystems, the involved participants, and their effect on sustainability, we investigated publicly available sustainability reports and triangulated them with primary and secondary data sources for each case, including websites and press reports. A sustainability report "provides and substantiates information about the status and progress of corporate sustainability towards internal and external stakeholders through formalized means of communication" (Hahn and Kühnen 2013, p. 7). Therefore, they served as a valuable unit for numerous scholarly investigations (e.g., Hoppe et al. 2024; Maibaum et al. 2024). Although there are varying standards, such reports typically draw on the Global Reporting Initiative (GRI). We collected and analyzed 32 reports with over 2000 pages of material across 7 years for Amazon, Etsy, and Walmart. We additionally collected exemplary e-commerce ecosystem participants' sustainability reports to augment the marketplace owners' initiatives and have a broader system perspective. Our participant analysis focused on manufacturers (Bosch, Foxconn, Microsoft), sellers (Bose, Lego, LG), service providers (DHL, Mastercard, Visa), IT providers (Amazon, Google, Alibaba), and third-party developers (Salesforce, Shopify). In addition, we analyzed 81 reports with over 5500 pages of reports from 14 complementary e-commerce ecosystem participants.

Data analysis

We conducted a qualitative content analysis to explore the sustainability reports, which facilitated a systematic analysis of the object of communication regardless of its form (Schreier

² We excluded e-commerce ecosystems from Asia despite their global reach as of the minimum availability of data in English.

2012). Coding and content structuring were conducted to extract information based on predefined categories (Mayring 2014). The UN's 17 SDGs were used as a coding scheme for the deductive category assignment (Appendix 5). To ensure robust and consistent coding across the coders, a detailed coding manual was created. It consists of detailed descriptions for each SDG, initiative examples, frequent questions, process information, and the initiative definition (i.e., an act intended to contribute to sustainability). The coding manual was iteratively updated during the process due to reflect ongoing lessons learned. Following Mayring (2014), we defined a single initiative as the smallest unit to be coded, which can include several sentences. A single initiative could be mapped to more than one SDG. The coding procedure was supported by MAXQDA.

We randomly distributed the marketplace owners' and ecosystem participants' sustainability reports among the team of authors for the content analysis. Sustainability-oriented initiatives were independently extracted and mapped to the ecosystem participants. After harmonizing the results created through the different coders, 122 unique code segments were identified. Since data was not equally available for all years, we limited our analysis to the period 2017–2021 to have comparable units of analysis. This resulted in a total of 135 initiatives from focal actors. On the ecosystem participant side (i.e., manufacturers, sellers, service providers, IT providers, third-party developers), which constitutes a considerably large subject of observation, a total of 1554 unique code segments were identified and assigned to at least one SDG. This codification was analyzed to compare and discuss a qualitative comparison between measures. This coding was analyzed to provide a qualitative comparison between the initiatives of marketplace owners and other participants (see Fig. 1).

Results: Sustainability in e-commerce ecosystems

The following sub-sections report on our findings from examining sustainability initiatives collected from the three case companies. The results are structured along the different

sustainability contributions of the ecosystem types investigated (e.g., purely digital and hybrid), the initiative's general coverage concerning the 17 SDGs, relationships between the SDGs addressed by an initiative, and the degree of involvement and comparison of e-commerce ecosystem participants in the initiatives. Detailed data, including a list of all references and identified measures are available in Appendix 1.

Ecosystem-specific contribution to sustainability from marketplace owners

In the subsequent analysis, we first independently examine the contribution of the three e-commerce ecosystems to achieving the SDGs and highlight the key characteristics of each ecosystem (see Fig. 2).

Amazon as a digital ecosystem focuses on initiatives to address environmental and societal goals in particular. This includes climate action (SDG 13) and reducing inequality (SDG 10), as well as collaborating with ecosystem participants to achieve common goals (SDG 17). As already mentioned, Amazon was among the funding members of The Climate Pledge (Stanley 2020) and implemented various attempts to reduce carbon emissions and promote the use of renewable energy (Apex 2020). Amazon is also concerned with improving working conditions (Amazon 2021c) and building a more diverse workforce (Amazon 2022). They joined numerous groups to advance sustainability in their supply chains (Amazon 2018) and formulated requirements for their suppliers and third-party sellers (Amazon 2021b, 2022).

The specialist ecosystem *Etsy* tends to focus on initiatives toward the reduction of inequality (SDG 10) and climate action (SDG 13). Etsy implemented primary social goals, such as fair employee evaluations (Etsy 2019) and attracted third-party sellers from minorities with benefits and specialized onboarding programs (Etsy 2021c). They announced the target of net zero carbon emissions by 2030 (Etsy 2021b). In contrast to Amazon and Walmart, we also could not identify initiatives to partner with other organizations (SDG 17).

Walmart—a hybrid with a stationary foundation and a digital expansion ecosystem—implemented the most

Table 2 Overview of focal platform case companies

Case characteristics	Amazon	Etsy	Walmart
Type	Digital	Specialist	Hybrid
Initial scope	E-commerce	E-commerce	Station-based
Assortment	Full	Sub	Full
Revenue in billion US\$ (2020)	386,064	1725	559,150
Employees	1,298,000	1400	2,200,000
Online shop/marketplace established	1995/1999	2005	2000/2009
Years of sustainability reports	2017–2021	2017–2021	2015–2022
Number of sustainability reports	17	7	8
Total pages of sustainability reports	488	524	1,053

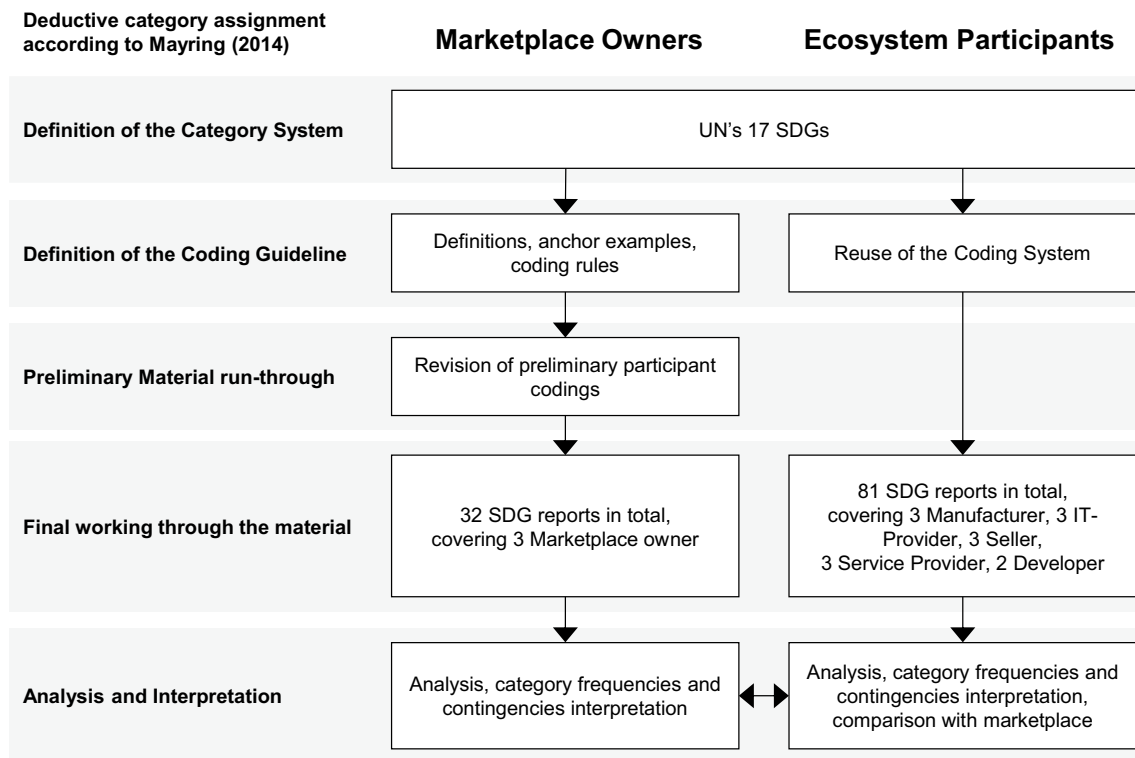


Fig. 1 Overview of data analysis procedure

initiatives in poverty reduction (SDG 1) with funding of emerging countries (Walmart 2019), adjusting wages to meet global standards (Walmart 2021a), and providing transparency about labor practices (Walmart 2021a). They also fight inequality (SDG 10) by ensuring ethical recruitment (Walmart 2018) and equity (Walmart 2022).

Based on the comparison of the ecosystems, the following observations emerged. *First*, none of the three marketplace owners address all of the 17 SDGs. As the SDGs cover a broad range of goals, this would require intensive investments and efforts from each of the organizations. Nonetheless, it becomes apparent that they do not focus on the most influential ones that can contribute to the overall SDG score, including SDGs 3, 4, and 7 (Asadikia et al. 2021). *Second*, in

line with prior literature on ecosystems (e.g., Jha et al. 2016; McRae et al. 2022), we see a tendency of all three actors toward addressing social issues in particular, such as reducing inequality and improving labor practices. *Third*, from an environmental viewpoint, initiatives for battling the overall climate action are mentioned frequently. This could be attributed to the fact that the SDG is often perceived as quite broad and may cover a large variety of initiatives.

Analysis of the initiatives from marketplace owners

In the second step, we analyze the aggregated contributions of the examined e-commerce ecosystems and evaluate their

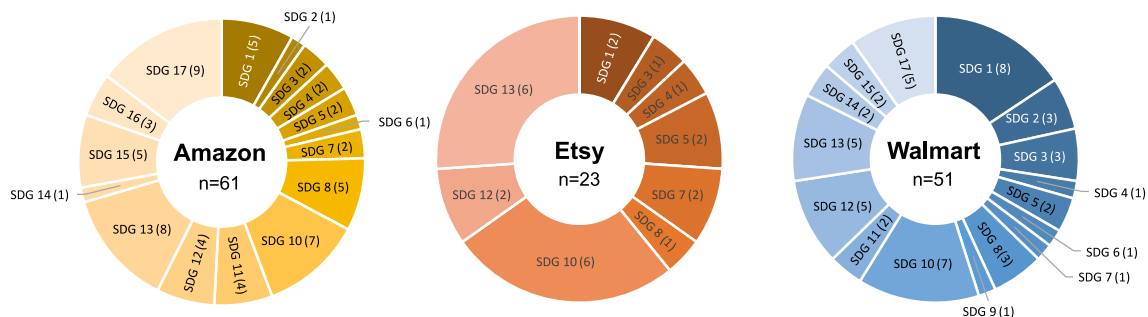


Fig. 2 Contribution to SDGs by e-commerce ecosystem cases

Table 3 Excerpt of initiatives to the 17 SDGs ordered by frequently

Sustainability initiatives	Relation to
<ul style="list-style-type: none"> - "In the U.S., Amazon's starting wage is \$15 per hour [...] hourly wage is 9.70 GBP in the UK, 16 CAD in Canada, 12 EUR in Germany, and 10.67 EUR in France" (A51). - "[We] implemented a more formal company-wide performance management process to support consistent and fair evaluations" (E09). - "Walmart [treats] workers with respect, [provides] a fair and inclusive work environment, [and combats] forced and underage labor" (W28; W35; W48). 	<div>SDG 10</div> <div>Reduced Inequality</div> <div>(14.8 %)</div>
<ul style="list-style-type: none"> - "[C]onduct an independent verification of the greenhouse gas (GHG) emissions reported by Amazon" (A06; A17; A29). - "Etsy will be sourcing 4.5 megawatts from a solar energy project" (E05). - Walmart wants to "be powered by 50 percent renewable energy by 2025 [and a]chieve zero waste to landfill in our operations in 2025" (W03). 	<div>SDG 13</div> <div>Climate Change</div> <div>(14.1 %)</div>
<ul style="list-style-type: none"> - "We influenced vendors to introduce [...] wage, benefits, and paid leave standards for their employees" (E19). - "[...], wages and training for millions of employees in U.S." (W01). - "Amazon does not tolerate the use of child labor, forced labor, or human trafficking in any form [...] in our operations or value chain" (A37). 	<div>SDG 1</div> <div>No Poverty</div> <div>(11.1 %)</div>
<ul style="list-style-type: none"> - "Amazon joined the Supplier Ethical Data Exchange (Sedex) and began leveraging their globally-recognized social assessments" (A04). - "Walmart and the Walmart Foundation have provided funds [...] to help organizations on the front lines of charitable food provision extend their reach and impact" (W22). 	<div>SDG 17</div> <div>Global Partnership</div> <div>(10.4 %)</div>
<ul style="list-style-type: none"> - "Support [...] sustainable and decarbonizing technologies and services" (A21). - "We seek to avoid having [...] chemicals in our [...] Private Brand Baby, Household Cleaning, Personal Care, and Beauty products in the U.S. and EU" (A28). - "We plan to reduce our waste through [three] strategies: Measuring waste, reducing waste from non-food items and packaging, [and] in our operations" (W19). 	<div>SDG 12</div> <div>Responsible Consumption & Production</div> <div>(8.1 %)</div>
<ul style="list-style-type: none"> - "Help children and young adults to build their best future" (A26). - "Amazon is committed to treating the people connected to our entire value chain with fundamental dignity and respect. [...] Our strategy to deliver on these commitments is based on the UNGPs [...]" (A57). - "Walmart [...] aim to improve livelihoods and strengthen the agriculture and production sectors in emerging markets" (W16). 	<div>SDG 8</div> <div>Decent Work & Economic Growth</div> <div>(6.7 %)</div>
<ul style="list-style-type: none"> - "Amazon created the Right Now Climate Fund, a 100 million fund to restore and conserve forests, wetlands, and grasslands around the world" (A49). - Walmart "[supports] on-the-ground regenerative agriculture" (W33). 	<div>SDG 15</div> <div>Life on Land</div> <div>(5.2 %)</div>
<ul style="list-style-type: none"> - "We use technology to help reduce physical demands on our employees. For example, we provide our fulfillment center employees with intelligent, wearable safety items that can communicate with robotic equipment in real time" (A59). - "We continue to expand our ERG communities [...] which now includes those focused on remote employees, mental health, and a group for Jewish employees" (E16). - Walmart "[encourages] the consumption of fruits and vegetables" (W23). 	<div>SDG 3</div> <div>Good Health</div> <div>(4.4 %)</div>
<ul style="list-style-type: none"> - "We take an intersectional approach to the policies, programs, and strategies we create [...] to build representation and inclusion into our business" (A54). - "Building a diverse, equitable, and sustainable supply chain [...]. Increasing the presence of underrepresented populations" (E01). - "Within our company, we are focused on fostering an inclusive culture and creating a more diverse, inclusive team at every level" (W44). 	<div>SDG 5</div> <div>Gender Equality</div> <div>(4.4 %)</div>

Table 3 (continued)

Sustainability initiatives	Relation to
<ul style="list-style-type: none"> - "Sustainable campuses offer a healthy environment in which our employees work, collaborate, and innovate" (A13). - "Goals to make the business more sustainable (Reducing, Reusing, and Recycling, Saving Energy and Water)" (A16). 	<div>SDG 11</div> <div>Sustainable Cities</div> <div>(4.4 %)</div>
<ul style="list-style-type: none"> - "[We used] 100% renewable energy for operations" (E21). - Walmart facilitates "avoided GHG emissions reductions in our supply chains, such as by promoting the use of tools to help suppliers identify, prioritize and implement energy efficiency projects" (W42). 	<div>SDG 7</div> <div>Modern Energy</div> <div>(3.7 %)</div>
<ul style="list-style-type: none"> - "We help address urgent issues faced by children and families [and] leverage our logistics network to support food banks and community organizations" (A60). - "Walmart donates 4 billion meals to fight hunger" (W05). - "Walmart and the Walmart Foundation have provided funds [...] to help organizations on the front lines of charitable food provision extend their reach and impact" (W21). 	<div>SDG 2</div> <div>Zero Hunger</div> <div>(3.0 %)</div>
<ul style="list-style-type: none"> - "Through Upskilling 2025, Amazon is creating pathways to careers [...]" (A52). - "To support our employees' development needs, our Learning and Development team offers trainings, programs, retreats, coaching, and online resources" (E04). - "Walmart opened nearly 200 Walmart Academies in the U.S." (W29). 	<div>SDG 4</div> <div>Education</div> <div>(3.0 %)</div>
<ul style="list-style-type: none"> - "Walmart collaborated with the National Fish and Wildlife Foundation (NFWF) to help establish the Acres for America" (W11). - "[F]ocused on efficiency and continuous innovation in our data centers to improve operational excellence and reduce our impact on the environment." (A24). 	<div>SDG 14</div> <div>Life below Water</div> <div>(2.2 %)</div>
<ul style="list-style-type: none"> - "Amazon is [...] actively participating in Business and Social Responsibility's Tech Against Trafficking working group." (A11). - "Our suppliers must comply with all applicable laws, as well as the requirements and principles outlined in our Supplier Code of Conduct" (A48). 	<div>SDG 16</div> <div>Peace and Justice</div> <div>(2.2 %)</div>
<ul style="list-style-type: none"> - "[F]ulfillment centers in India, enhancements including solar arrays, building energy management systems, and water conservation" (A15). - "[...] AWS is expanding our use of non-potable water for cooling purposes" (A50). - "[...] conserve water in our own operations by improving efficient water use" (W10). 	<div>SDG 6</div> <div>Clean Water</div> <div>(1.5 %)</div>
<ul style="list-style-type: none"> - "Our Ethics & Compliance programs have six [blocks]: Leadership, Risk assessment, Standards and controls, Awareness, Training, Monitoring and response" (W30). 	<div>SDG 9</div> <div>Infrastructure & Innovation</div> <div>(0.7 %)</div>
Number of initiatives (n):	<div>1 - 5</div> <div>6-10</div> <div>11 - 15</div> <div>> 15</div>

average influence on achieving the SDGs. The total set of 135 initiatives extracted from our sample of marketplace owners as focal actors spans all 17 SDGs. Whereas the majority

of the initiatives (67 %) could be assigned to one distinct SDG, one-third (33%) addresses more than a single SDG due to the diversity of their overall objectives. For instance, the

formation of the Leadership Development and Compensation Committee as a governance initiative was associated with SDG 5 (gender equality), SDG 8 (decent work), and SDG 10 (reduce inequality) because the committee oversees human resource management matters, including workplace safety, culture, diversity, discrimination, and harassment (Amazon 2021d). In Table 3, we provide an overview of the SDGs and examples of their corresponding sustainability initiatives. The associated IDs are indicated in parentheses for each initiative; an overview can be found in Table 7 of Appendix 1. For comparability, certain initiatives that span multiple years were interpreted as separate initiatives per year, for which reason some have been assigned to multiple IDs.

Based on the synthesis of the results, three major observations emerged. *First*, the analysis shows that each SDG was addressed at least once. This demonstrates the relevance of the SDGs from the perspective of marketplace owners as they implemented a wide range of initiatives to meet sustainability. *Second*, a great heterogeneity in meeting the individual SDGs and an associated focus on a few goals can be observed. Marketplace owners perform initiatives primarily targeting five of the 17 SDGs; see frequencies below. Both reducing inequalities between countries (14.8 %) and mitigating climate change (14.1 %) were found to be essential parts and are addressed across the three e-commerce ecosystem cases examined. Etsy, for instance, sourced its electricity completely from renewable sources in 2020 and has pledged to realize its Net Zero Carbon Emissions goal by 2030 (Etsy 2021a). Amazon was among the co-founders of The Climate Pledge (Amazon 2019b). Walmart sets certain standards for its suppliers to prevent forced labor and ensure a safe workplace environment (Walmart 2021b). *Third*, we recognize that some SDGs were addressed with only moderate efforts, which is indicated by the fact that half of the SDGs were addressed by only five initiatives or fewer. Among the less-mentioned SDGs are those for ensuring access to sustainable water and sanitation (1.5%) as well as building resilient infrastructure and sustainable industrialization (0.7 %).

Dependencies between sustainability goals within the initiatives from marketplace owners

To explore which SDGs appear individually and which typically occur together in the 135 initiatives from the focal actors, we examined relationships within our sample. This is important because scholars have already started to examine what combinations lead to the biggest impact on the SDG score (Sachs et al. 2019) and which SDGs are mutually dependent on each other. Moreover, there can be an unequal prioritization of the SDGs that impacts the decisions concerning investments, policies, and action programs of organizations (e.g., Asadikia et al. 2021). Although these insights only provide some indications based on our coding,

they are capable of broadening the analysis scope and supporting the existence of (context-specific) SDG compositions. The related initiatives, including statements from the coding, can be found in Appendix 2.

From the analysis, the following three observations emerged. *First*, we found SDGs that are often addressed as an ensemble in our sample. For instance, SDG 10 for reduced inequalities is frequently combined with other goals, including SDG 1 (no poverty) to implement social protections, SDG 8 (decent work) to ensure equal opportunities (e.g., “The [...] Committee oversees human capital management matters, including workplace safety, culture, diversity, discrimination, and harassment,” Amazon A40/41/42) and promote social inclusion (“We focused on targeted recruitment of underrepresented minorities”, Etsy E10/11), as well as SDG 5 (gender equality) to reduce issues of inequality in terms of gender. Additionally, we found that SDG 1 to fight poverty is often addressed in combination with, for instance, the aforementioned reduction of inequalities but also with SDG 8 for decent work in which initiatives aim to “[...] improve livelihoods and strengthen the agriculture and production sectors in emerging markets” (Walmart W15/16). These relationships can be explained by the fact that the SDGs are intended to bring peace and prosperity to all people and therefore need to ensure equal prerequisites across all areas (UNDP 2023). Besides, the combinations are comparable to other clusters of SDGs, such as Sachs et al.’s (2019, p. 2) transformation strategy I “[that] promotes economic growth, the elimination of extreme poverty, decent work, and overcoming gender and other inequalities.”

Second, other dependencies are informed by rather thematic relations, such as affordable access to and efficient handling of resources. This is supported by, for instance, combinations of SDG 6 for clean water and SDG 7 for modern energy (e.g., “enhancements including solar arrays, building energy management systems, and water conservation [to] advancing operations efficiency”, Amazon A14/15).

Third, we observed that some SDGs are mentioned only individually in our sample. Among those goals are SDG 12 for sustainable consumption and production, SDG 9 for industry and innovation, and SDG 14 for life below water (e.g., “Walmart collaborated with the National Fish and Wildlife Foundation (NFWF) to help establish the Acres for America”, Walmart W11). Further examples rather exclusively focus on SDG 3 for good health and well-being with a broad variety from individuals (e.g., “We use technology to help reduce physical demands on our employees”, Amazon A59), over communities (e.g., “In regions with fewer options [...] we launched Neighborhood Health Centers”, Amazon A58), to entire societies (e.g., “With more than 11,500 stores around the world, we provide access to low-cost, nutritious food for millions of people”, Walmart W23). This might be attributed to the fact that activities in the realm of healthcare,

for instance, need to be focused as they directly impact people's lives.

Ecosystem participants involved in initiatives from marketplace owners

Building upon the case study of the three ecosystems, a total of 488 connections to individual ecosystem participants in the implementation of sustainability initiatives were analyzed and synthesized in Fig. 3. The generalization was conducted by normalizing the data from the three cases and calculating the mean value across them (see Appendix 3). The focal circle diagram associated with the marketplace owner indicates the share of each ecosystem participant addressed with sustainability initiatives. The focal diagram is surrounded by circle diagrams for each ecosystem participant depicting the share of SDGs attributed to the initiatives taken on by the marketplace owner. The size of the participants' circle diagrams in the periphery is proportional to the initiatives addressing the participants. This analysis provides multiple insights into the involvement of ecosystem participants in achieving sustainability goals. By quantifying the involvement of the different participants, it is possible to derive recommendations targeting specific ecosystem participants.

Through analyzing the involvement of other actors in initiatives implemented by the marketplace, several observations emerged. *First*, manufacturers play with 24.6% of the total a major part in the initiatives, followed by sellers and resellers (18.6 %) and service providers (18.2%). Developers (3.5%) and investors (3.3%) are only marginally involved in the initiatives, as disclosed by the sample of reports. *Second*, our analysis uncovers which SDGs are more often addressed when collaborating with certain types of actors. Manufacturers were mainly involved in reducing inequality (SDG 10) and poverty (SDG 1). Similarly, sellers were frequently part of initiatives focusing on inequality and poverty, as well as climate action (SDG 13). Investors are mostly included in initiatives for climate action. Consumers were involved when it comes to responsible consumption and production (SDG 12) and well-being (SDG 3).

Third, these trends are also reflected in the single ecosystem cases. Amazon mainly includes manufacturers, sellers, and service providers to address poverty reduction (SDG 1), partnerships (SDG 17), and life on land (SDG 15). Although Amazon is a quoted company, investors are underrepresented in their initiatives (see Fig. 6). For Walmart, the global reduction of poverty (SDG 1) is often mentioned. This is also observable in the involvement of other participants in their ecosystem. Moreover, almost all participants are involved when it comes to climate action (SDG 13) (see Fig. 7). Etsy's focus on hand- and custom-made products leads to a strong involvement of consumers, which opens

opportunities to advance responsible consumption and production (SDG 12). Therefore, Etsy heavily relies on external IT providers to support its operations (see Fig. 8, Appendix 4). Appendix 3 provides details on participants' engagement in the marketplace owner's initiatives, including the associated SDGs, supported by a visualization of their participation in each case.

Comparison of results to initiatives of complementary companies

The results presented above are based on the 32 reports from the three focal actors in our ecosystem cases. To consider a broader view of the e-commerce ecosystem actors, we further collected data from selected companies for the ecosystem's core roles (i.e., manufacturer, developer, seller, service provider, and IT provider) across our three cases of Amazon, Etsy, and Walmart (see right strand of data collection for ecosystem participants in Fig. 1 of the research design). This allows us to explore what actors who are not taking a central role contribute to sustainability and whether there are any fundamental differences between all roles in an ecosystem. Therefore, we again collected 81 sustainability reports from 14 complementary companies of the focal e-commerce platforms and coded the reports according to the above-mentioned schema.

Generally, we can observe some differences in how often an SDG is addressed by a role. For illustration, there is a social focus from developers who have numerous initiatives on quality education (SDG 4), gender equality (SDG 5), and reduced inequality (SDG 10), whereas IT providers and manufacturers address especially responsible consumption/production (SDG 12) and climate action (SDG 13), as well as sellers who pay attention to good health and well-being (SDG 3) (see Table 4).

While there are differences in the distributions, our analysis points to the fact that these are often not specific to an ecosystem role. Next, we elaborate on example codes and differences compared to our main role, the marketplace (see Table 3). Take, for instance, the role of the seller: Sellers perform better in SDG 3 ($\Delta > 11\%$) with aspects of customer well-being (e.g., "Our long-standing mission is to create products that improve people's lives" (Bose 2020)), charity, and working environments (e.g., "Employee safety and wellbeing is a top priority, and we aim for zero accidents in our factories, stores and offices" (LEGO 2022)). Furthermore, sellers excel in SDG 4 for education ($\Delta > 8\%$) such as staff training or educating society (e.g., "Lead the effort for children to develop and apply the breadth of skills needed to thrive and to solve problems creatively" (LEGO 2022)). Developers have many initiatives for SDG 4 ($\Delta > 20\%$) including training students (e.g., "[...] Salesforce will train Ivy Tech Community College students and Indiana

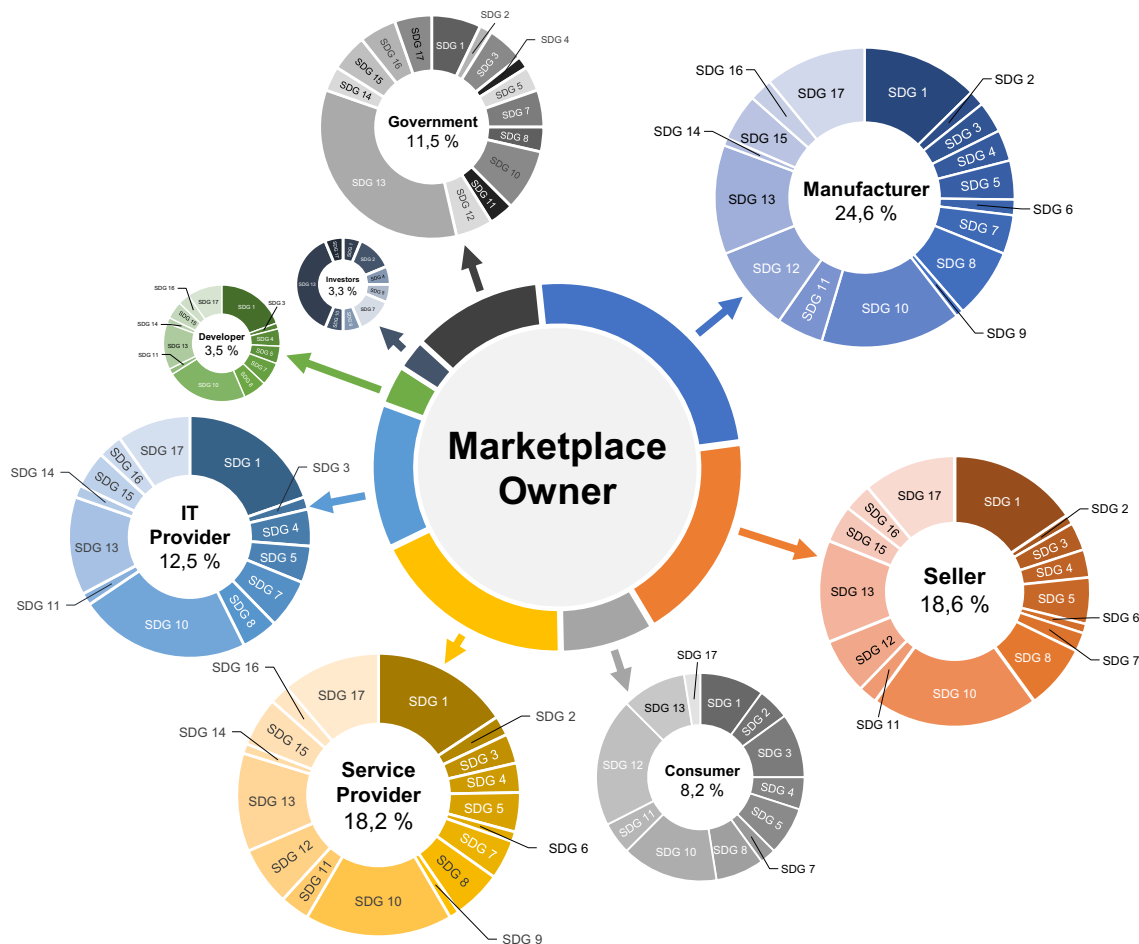


Fig. 3 Involvement in initiatives from marketplace owners by ecosystem participants

veterans with the technical and business skills they need to become Salesforce administrators and developers” (Salesforce 2019)) and SDG 10 ($\Delta > 6\%$) to reduce inequalities such as equal pay (e.g., “have invested more than \$12 million to ensure Equal Pay for Equality Work” (Salesforce 2020)). In contrast to marketplaces, manufacturers perform more initiatives for SDG 1 on no poverty ($\Delta > 7\%$), SDG 9 for industry and innovation ($\Delta > 8\%$) such as advancing innovative research (e.g., investing in research and partnering with research institutes and universities, Bosch 2020; Microsoft 2023) and improving infrastructure (e.g., more sustainably friendly (road) infrastructure, Microsoft 2018)), and SDG 10 ($\Delta > 13\%$) including “support nonconventional career paths” and create inclusive working environments (Bosch 2019). Generally, while marketplace owners only implicitly engage in infrastructure and innovation, manufacturers heavily invest in common infrastructure, collective innovation, and sustainable industrialization. Lastly, from a provider perspective, several differentiations occur: Service providers have major differences in terms of SDG 4 ($\Delta > 9\%$), SDG 5 ($\Delta > 6\%$), and SDG 8 ($\Delta > 4\%$) for decent

work and IT-providers perform better than marketplaces regarding SDG 4 ($\Delta > 8\%$), SDG 12 ($\Delta > 7\%$) for responsible consumption including the implementation of circular economy principles to reuse server hardware (Google 2024) and SDG 13 ($\Delta 7\%$) for climate action.

The comparison of code frequencies (i.e., fulfilled SDGs by a role) corroborates the previously outlined observations (see Table 5). Overall, certain SDGs are more frequently addressed by the principal actor compared to complementary ecosystem participants. Notably, digital marketplace initiatives increasingly focus on alleviating poverty (SDG 1; $\Delta < -8\%$) and reducing inequality (SDG 10; $\Delta < -6\%$). Conversely, complementary ecosystem participants demonstrate a stronger inclination towards fostering innovation through educational initiatives (SDG 4; $\Delta > 10\%$) and advancing industry and infrastructure (SDG 9; $\Delta > 4\%$). Furthermore, evidence of collaborative efforts towards achieving sustainability goals is apparent. Both complementary ecosystem participants and the digital marketplace ascribe similar importance to clean energy (SDG 7; $\Delta = 0.5\%$), decent work (SDG 8; $\Delta = 0.2\%$), and sustainable urban development (SDG 11; $\Delta = 0.8\%$).

Table 4 Comparison of code frequency across ecosystem participants

	SDG 1	SDG 2	SDG 3	SDG 4	SDG 5	SDG 6	SDG 7	SDG 8	SDG 9	SDG 10	SDG 11	SDG 12	SDG 13	SDG 14	SDG 15	SDG 16	SDG 17
Developer	0.9 %	0.0 %	3.1 %	23.1 %	9.6 %	0.0 %	2.1 %	8.2 %	5.2 %	20.2 %	2.4 %	5.9 %	13.2 %	0.0 %	0.5 %	0.7 %	4.9 %
IT Provider	0.0 %	0.0 %	3.2 %	11.6 %	5.3 %	8.4 %	9.5 %	2.1 %	3.2 %	4.2 %	5.3 %	15.8 %	21.1 %	0.0 %	1.1 %	0.0 %	9.5 %
Manufacturer	3.9 %	1.0 %	8.6 %	9.4 %	2.3 %	4.2 %	5.0 %	5.0 %	9.1 %	1.7 %	3.4 %	15.1 %	19.9 %	0.8 %	1.2 %	2.2 %	7.2 %
Seller	3.8 %	2.8 %	16.3 %	11.2 %	4.3 %	1.3 %	3.1 %	5.6 %	5.6 %	7.4 %	6.1 %	11.5 %	12.5 %	0.0 %	0.3 %	1.5 %	6.6 %
Service Provider	6.4 %	2.3 %	4.6 %	12.4 %	11.0 %	0.0 %	1.4 %	11.5 %	2.3 %	6.4 %	9.2 %	4.1 %	12.4 %	0.0 %	0.0 %	2.3 %	13.8 %

Discussion

Given the power of ecosystems to drive transformations and address complex social problems (Jha et al. 2016), this paper conducted an embedded multi-case study of successful e-commerce ecosystems from digital and hybrid forms to identify a series of initiatives and their impact on sustainability. Accordingly, we (1) introduce what are ecosystem-specific contributions to the SDGs (see “[Ecosystem-specific contribution to sustainability from marketplace owners](#)” section) as well as present a general overview of 135 initiatives collected from focal actors (i.e., marketplace owners) and their mapping to the SDGs (see “[Analysis of the initiatives from marketplace owners](#)” section). Based on the cases, we (2) examine the dependencies between SDGs within these initiatives (see “[Dependencies between sustainability goals within the initiatives from marketplace owners](#)” section) to improve effective decision-making and (3) explore which ecosystems participants are involved in and what their specific contributions are to the SDGs (see “Ecosystem participants involved in initiatives from marketplace owners” and “[Comparison of results to initiatives of complementary companies](#)” section).

Contribution to e-commerce ecosystems and sustainability research

Our work at the intersection of e-commerce ecosystems and sustainability makes important contributions to research and practice, which are discussed in relation to the existing literature in the following.

First, the characteristics of the focal marketplace affect the ecosystem-specific contributions. Our case analysis indicates that a hybrid platform with a stationary foundation and a digital expansion ecosystem (i.e., Walmart) primarily emphasizes social initiatives on poverty reduction, fair labor

practices, and equity. In contrast, a purely digital ecosystem (i.e., Amazon) predominantly focuses on economic objectives for establishing global partnerships and environmental goals for fostering climate action. The specialist e-commerce ecosystem (i.e., Etsy) addresses both social and environmental issues, such as inequalities and climate action, but does not emphasize economic goals for global partnerships. In consequence, managers and founders can reflect on their goals and how they are compatible with a certain type of e-commerce ecosystem when it comes to establishing, implementing, or redesigning new ecosystems.

Second, there are positive intentions of focal ecosystem platforms to contribute to a wide range of sustainability goals. By screening 135 initiatives from marketplace owners, the results show that e-commerce ecosystems are generally willing and able to address sustainability, evidenced by the fact that all of the SDGs are fulfilled at least once. The initiatives from our case companies Amazon, Walmart, and Etsy cover societal goals (e.g., SDG 10 for reduced inequality with 14.8% and SDG 1 for no poverty with 11.1%), environmental goals (e.g., SDG 13 for climate action with 14.1%), and economic goals (e.g., SDG 17 for global partnership with 10.4%). With our work, we make sustainability initiatives a subject of discussion at the ecosystem level, abstracting from the peculiarities, restrictions, and goals of single organizations (Adner 2017). We also broaden the value perspective that is often focused on profit maximization and show the promising ability of such ecosystems to globally foster numerous facets of sustainability.

In comparison to other investigations concerned with disclosing what SDGs are met, our sample of ecommerce cases has a rather broad coverage of the goals. For instance, technology-oriented analyses of IS research on AI and sustainability (Schoormann et al. 2021; 2023) highlight the impact on social sustainability, ensuring good health and well-being in particular. Contrarily to our work, other studies

Table 5 Comparison of code frequency between complementary roles and the digital marketplace

	SDG 1	SDG 2	SDG 3	SDG 4	SDG 5	SDG 6	SDG 7	SDG 8	SDG 9	SDG 10	SDG 11	SDG 12	SDG 13	SDG 14	SDG 15	SDG 16	SDG 17
Ø compl. roles	3,0 %	1,2 %	7,1 %	13,5 %	6,5 %	2,8 %	4,2 %	6,5 %	5,1 %	8,0 %	5,3 %	10,5 %	15,8 %	0,2 %	0,6 %	1,4 %	8,4 %
marketplace	11,1 %	3,0 %	4,4 %	3,0 %	4,4 %	1,5 %	3,7 %	6,7 %	0,7 %	14,8 %	4,4 %	8,1 %	14,1 %	2,2 %	5,2 %	2,2 %	10,4 %
Δ	-8,1 %	-1,7 %	2,7 %	10,6 %	2,1 %	1,3 %	0,5 %	-0,2 %	4,3 %	-6,8 %	0,8 %	2,3 %	1,7 %	-2,1 %	-4,6 %	-0,9 %	-2,0 %

The SDGs tend to be more addressed by marketplace complementaries

point to blind spots for SDGs on no poverty, gender equality, and reduced inequalities. This might be attributed to the fact that technology itself has another focus but results in possible (also unintended) consequences during its application in the real world, such as in digital ecosystems. While e-commerce ecosystems use digital infrastructure, they can be positioned as socio-technical phenomena in which various actors across business collaborators and customer segments follow a certain objective or intention. With this view, ecosystems might be able to address a broader coverage of the SDGs than phenomena focusing on either the technical or the social/organizational side.

Considering the ability of ecosystems to make use of digital technology might also influence sustainability performance. While IS research has stressed the role of digital artifacts (Melville 2010) for transformation towards becoming more sustainable (Kotlarsky et al. 2023) as well as for establishing ecosystems to create social value (Wang et al. 2021), there are underrepresented areas identified in our analysis. Among others, these include the exploitation of how digital solutions can increase efficiency, reduce carbon emissions, and support manual tasks in business processes. As an illustration, essential sustainability areas in retail and e-commerce are return processes and the recycling of (old) products (Auf der Landwehr et al. 2023; Recker et al. 2024; Zeiss et al. 2021). Retailers are forced by law to return articles sold and establish return processes (Otto 2011). Nonetheless, to date, these return processes are neither codified in reference models (Schütte 2011) nor implemented against sustainability considerations, with manifold articles being destroyed instead of resold (New York Post 2021). The destruction of returned products especially takes place in retail domains with products that are less expensive than return expenses. Therefore, focal platform owners can establish an individual marketplace or domain for reselling returned or used products (Ma et al. 2020) and also integrate these marketplaces with brick-and-mortar stores like Walmart. By taking this into account, the negative consequences of e-commerce ecosystems on the environment might be mitigated, such as the growing amount of packaging waste and carbon emissions due to logistics (Yen and Wong 2019).

Third, there are commonalities in the combinations of SDGs within the focal actor's sustainability initiatives. The identification of which SDGs occur together and which ones are rather addressed individually helps managers and decision-makers to make more informed plans. If some SDGs are already implemented in an organization, they can reflect on additional SDGs that occur commonly together and might be easier to fulfill in certain situations. From a design viewpoint, future research should engage with prescriptions, such as in the form of reference models, methods, and principles, about how to design e-commerce ecosystems to best possibly cover numerous facets of sustainable development.

Fourth, focal actors have the power to influence sustainability initiatives of the entire ecosystem. As assumed, focal actors can influence other ecosystem actors (Boudreau 2010; Hein et al. 2020) and implement ecosystem-wide sustainability due to their gate-keeping function. They play a pivotal role and need to be aware and equipped with tools capable of providing impulses on what sustainability goals can be achieved and how their ecosystems can act as a catalyst for that. Focal actors have the power to set sustainability-oriented rules and overarching intensions of the ecosystems, affecting both their collaborators and customers. Potential businesses and organizations seeking to participate need to ensure compliance with the ecosystem rules as well as can be selected and monitored by the focal actor. For customers, since we see changing interests towards more sustainability and contributing to the overall social good (e.g., Rosemann et al. 2023), a clear mission of an ecosystem can lead to increasing customer attraction and loyalty. The ability of these focal actors was limited by antitrust law considerations created by governments and related authorities in the United States (Kang 2021) and Europe (Satariano 2020). Most of the identified initiatives address the upward part of the supply chain because platform owners have the highest power over these participants, including sellers and manufacturers: They can remove participants' products not complying with (parts of) a participant code of conduct. The focal platform owner's power in ecosystems is even amplified when taking on a dual or triple role as a platform owner and simultaneous seller of goods and IT provider (Wulfert and Schütte 2022).

Our results present practitioners' pathways to effectively establish collaborative partnerships with other ecosystem actors to orchestrate sustainability implementations, such as manufacturers and sellers. Given that the ecosystem participants can address different SDGs based on their varying interests and resources (see comparison of complementary companies above), it is important the focal actors thoroughly balance and integrate additional companies in line with the ecosystem's overall mission. Thereby, they need to manage potential tradeoffs occurring from, on the one hand, attracting many companies as possible to leverage the growth of the ecosystem and, on the other hand, selecting only companies that comply with a certain set of rules and aims. Compared with research in brick-and-mortar environments (e.g., Böttcher et al. 2021), our results point to altered and additional participants in the e-commerce context. Brick-and-mortar-specific roles, such as store equipment providers, are not considered in e-commerce ecosystems, as virtual locations are created by IT providers and developers. The role of data suppliers is also diminishing in e-commerce, as platform owners can collect and analyze customer data themselves, exploiting customers' search information, click-data, and mouse movements (Tanjim-Al-Akib et al. 2016). We also identified the potential for more holistic sustainability initiatives involving numerous participants as government, investors, IT providers, and customers who are rarely addressed. The owners of focal platforms in e-commerce are even more likely to exploit multiple information asymmetries compared with brick-and-mortar environments. This also leads to asymmetric pricing measures, preferring selected ecosystem participants (e.g., customers) (Rochet and Tirole 2003).

Our work lays the groundwork for theorizing the dependencies among ecosystem participants and their contributions to specific SDGs. It also encourages further investigation into how the focal platform's orchestration role can be utilized to systematically advance SDG achievement.

Implications for e-commerce ecosystem participants

Our findings reveal a heterogeneous approach to achieving the SDGs through marketplace ownership, underscoring the importance of identifying gaps—SDGs that are either neglected or inadequately addressed. Platform owners should ensure their resources are deployed to cover a broad spectrum of SDGs. Moreover, marketplace providers are uniquely positioned to facilitate SDG achievement by leveraging initiatives from complementary providers (e.g., manufacturer, IT provider, and developer) within the ecosystem. This necessitates a deep understanding and effective orchestration of the capabilities and resources of these complementary actors by the focal platform provider. In addition, marketplace owners should evaluate whether certain measures have a positive impact on the achievement of multiple SDGs, thereby

maximizing potential synergies. Our research emphasizes the critical role of focal platform in generating economies of scale that extend beyond profit maximization to encompass broader public benefits. Consequently, it is imperative that digital marketplaces leverage their dominant position to ensure comprehensive SDG coverage across the entire ecosystem, ideally within the framework of sustainability governance.

Limitations and future research

Although our paper identifies existing e-commerce ecosystem initiatives for boosting sustainability, it is not devoid of limitations, which in turn provide opportunities for further research. First and foremost, we anticipate concerns with the source in the form of reports. Such reports face challenges in terms of appropriate data, greenwashing, and lack of standardization and might be used to beautify negative impacts for generating a positive image (e.g., Pucker 2021). However, the reports enhance the transparency of sustainability data and share insights among stakeholders. As we seek to collect a list of initiatives that help to give practice an orientation on what can be done, it is still useful even when the initiatives might not be implemented in the real world. Being aware that this is rather the bright side of ecosystems and there are negative consequences too (e.g., risk of environmental degradation) (Leong et al. 2016), we sought to take this into account through the investigation of several case companies and several reports. Although digital ecosystems can accelerate transformative change and address complex social problems (Alt 2020; Jha et al. 2016), they also exploit network effects, often leading to winner-takes-all market dynamics and potential abuse of dominance (Hermes et al. 2020). This dual nature of digital platforms, with their vast potential, poses risks of malpractice and highlights the need for regulation—a challenging endeavor (Gleiss et al. 2023). Our research demonstrates that marketplace owners are uniquely positioned to leverage structured approaches to address the SDGs through inter-organizational efforts, such as supplier agreements. However, our analysis reveals a predominantly heterogeneous alignment with SDGs among contributors, likely due to varying capabilities and resources.

Furthermore, power relations with the main actor may also influence the choice of initiatives by the complementary actors. The findings highlight the potential for specific collaborations and partnerships within the ecosystem to drive collective progress towards sustainability. One promising approach is the selective orchestration of sustainability initiatives through the digital marketplace (Coskun-Setirek et al. 2024) and an adaptation of governance mechanisms for implementation (Hein et al. 2016). The available resources within the ecosystem have the potential to be leveraged not only to meet the value proposition but also to achieve sustainability goals through coordinated efforts (Staub et al.

2022; Tiwana 2014). Based on these findings, regulators and policymakers should consider designing measures and incentives tailored to the different players in the e-commerce ecosystem. This raises crucial questions about the distinct contributions of various e-commerce ecosystem roles (e.g., marketplace owners, sellers, IT providers) in promoting the Sustainable Development Goals (SDGs). Future research could explore this further by investigating other transaction platforms (e.g., mobility) or innovation ecosystems (e.g., mobile platforms). Additionally, this highlights the need for marketplace owners to embrace their role as SDG multipliers, orchestrating ecosystem participants' efforts to achieve specific SDGs. Another research avenue involves examining how platform owners can be incentivized (e.g., through regulation, and customer demands) to integrate SDGs into platform governance. Moreover, future research could use additional sources, such as reports provided by independent non-governmental organizations and foundations, to mitigate bias from one-sided presentations. Despite exploring general ecosystems for e-commerce, scholars can focus on more specific domains to disclose similarities and/or context-specific factors, including grocery and furniture retail.

As another point for future research, there is a demand for the ecosystem-wide measurement of the effectiveness of sustainability initiatives implemented by a focal platform owner. Despite the assurance of sustainability initiatives in companies' sustainability reports, the actual implementation of these initiatives and particularly their effectiveness on an ecosystem level remains unclear. From an operationalizing standpoint, scholars can pick up the list of extracted endeavors and explore what capabilities are required and how people should be trained (e.g., Teece et al. 1997) or what resources are required in an organization (e.g., Barney 1991). In terms of effectiveness, it should be noted that considering the SDGs during the creation of sustainability reports does not automatically lead to structural changes in business strategy and processes but could lead to some degree of corporate greenwashing (Jakobsen 2022; Lashitew 2021; Laufer 2003). The impact of an initiative on the ecosystem's SDG score therefore needs to be shown in the real world (Jakobsen 2022; Seidel et al. 2014).

Lastly, there are methodical decisions made in this paper that need to be considered. The coding of the sustainability initiatives in the context of the case study is based on individual choices, experiences, and discussions among the author team. Other investigations might use different theoretical lenses (e.g., resource-based view or affordances) and, in contrast to our author-based analysis, employ machine learning-based approaches (e.g., text and topic mining) to provide further insights and explore even larger datasets. As another restriction, we limited our case analysis to three cases (i.e., Amazon, Etsy, and Walmart) representing major e-commerce platforms in terms of their numbers for revenue

and employees. While these selected cases cover different types from digital to hybrid systems and might serve as a blueprint for the majority of existing e-commerce ecosystems, the investigation of additional cases, such as eBay and Mercado Libre, could refine or extend our work. The selection of other cases, for instance, organizations that have a strong sustainability focus on their mission might also result in other findings with a broader coverage of goals.

Conclusion

The participants of an e-commerce ecosystem surround a focal platform to conduct and support (retail) transactions. An e-commerce ecosystem integrates the entire supply chain, from manufacturers to customers. The flow of goods and information is augmented by digitalized artifacts, IT providers, and third-party developers, providing the necessary (digital) transaction environment. The owner of the platform has a central gatekeeping role and the power to control, orchestrate, and govern sustainability initiatives across their entire ecosystems. The analysis of focal actors of the e-commerce ecosystem revealed corresponding initiatives for all 17 SDGs with particular emphasis on inequality and climate action. We found that a focal platform's sustainability efforts often positively influence participants up- and downstream of the supply chain, which underlines their important role and gives impulses for the design and/or transition of ecosystems in terms of sustainability. Furthermore, we were able to demonstrate the impact of ecosystem participants on the individual SDG levels, thus showing in which areas the ecosystem participants are particularly active and where there are still gaps. Overall, our work is intended to complement the body of ecosystem literature in general and e-commerce in particular by shedding light on what sustainability initiatives are performed in such systems. This is important because ecosystems have great potential to mobilize transformational changes toward becoming more sustainable beyond institutional and disciplinary boundaries.

Supplementary Information The online version contains supplementary material available at <https://doi.org/10.1007/s12525-024-00733-z>.

Funding Open Access funding enabled and organized 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

- Abbu, H. R., Fleischmann, D., & Gopalakrishna, P. (2021). The digital transformation of the grocery business - driven by consumers, powered by technology, and accelerated by the COVID-19 pandemic. In Á. Rocha, H. Adeli, G. Dzemyda, F. Moreira, & A. M. Ramalho Correia (Eds.), *World Conference on Information Systems and Technologies (WorldCIST 2021)* (pp. 329–339). Hangra de Heroisma, Terceira Island, Azores, Portugal.
- Adner, R. (2017). Ecosystem as structure. *Journal of Management*, 43(1), 39–58. <https://doi.org/10.1177/0149206316678451>
- Alami, D., Rodriguez, M., & Jansen, S. (2015). Relating health to platform success: exploring three E-commerce ecosystems. In : *ECSAW '15, Proceedings of the 2015 European Conference on Software Architecture Workshops* (pp. 1–6). New York, NY, USA: Association for Computing Machinery.
- Alt, R. (2020). Electronic markets on sustainability. *Electronic Markets*, 30(4), 667–674. <https://doi.org/10.1007/s12525-020-00451-2>
- Amazon. (2018). *Modern day slavery statement*. Retrieved from <https://sustainability.aboutamazon.com/2017-modern-slavery-statement.pdf>
- Amazon. (2019a). *Amazon Annual Report 2018*. Retrieved from https://s2.q4cdn.com/299287126/files/doc_financials/annual/2018-Annual-Report.pdf
- Amazon. (2019b). *Sustainability: thinking big*. Retrieved from <https://sustainability.aboutamazon.com/2018-sustainability-report.pdf>
- Amazon. (2021a). *Amazon Annual Report 2020*. Retrieved from https://s2.q4cdn.com/299287126/files/doc_financials/2021/ar/Amazon-2020-Annual-Report.pdf
- Amazon. (2021b). *Modern slavery statement*. Retrieved from <https://sustainability.aboutamazon.com/2020-modern-slavery-statement.pdf>
- Amazon. (2021c). *Modern slavery statement*. Retrieved from <https://sustainability.aboutamazon.com/2020-modern-slavery-statement.pdf>
- Amazon. (2021d). *Modern slavery statement 2020*. Retrieved from <https://sustainability.aboutamazon.com/modern-slavery-statement-2020.pdf>
- Amazon. (2022). *Amazon's 2021 Sustainability Report*. Retrieved from <https://sustainability.aboutamazon.com/2021-sustainability-report.pdf>
- Apex. (2020). *Independent limited assurance statement*. Retrieved from <https://sustainability.aboutamazon.com/2019-renewable-energy-assurance.pdf>
- Asadikia, A., Rajabifard, A., & Kalantari, M. (2021). Systematic prioritisation of SDGs: machine learning approach. *World Development*, 140, 105269. <https://doi.org/10.1016/j.worlddev.2020.105269>
- Auf der Landwehr, M., Schoormann, T., Viebahn, C. von, & Trott, M. (2023). From purchase to pantry – exploring archetypes and strategies in the context of e-grocery fulfilment. *European Journal of Information Systems*, 1–39. <https://doi.org/10.1080/0960085X.2023.2180446>
- Aulkemeier, F., Iacob, M. E., & van Hillegersberg, J. (2017). An architectural perspective on service adoption: a platform design and the case of pluggable cross-border trade compliance in e-commerce. *Journal of Organizational Computing and Electronic Commerce*, 27(4), 325–341. <https://doi.org/10.1080/10919392.2017.1363588>
- Aulkemeier, F., Paramartha, M. A., Iacob, M. E., & van Hillegersberg, J. (2016). A pluggable service platform architecture for e-commerce. *Information Systems and e-Business Management*, 14(3), 469–489. <https://doi.org/10.1007/s10257-015-0291-6>
- Balachandran, B. M., & Mohammadian, M. (2015). Development of a fuzzy-based multi-agent system for E-commerce settings. *Procedia Computer Science*, 60, 593–602. <https://doi.org/10.1016/j.procs.2015.08.186>
- Baldwin, C. Y., & Woodard, J. C. (2009). The architecture of platforms: a unified view. In A. Gawer (Ed.), *Platforms, Markets and Innovation* (pp. 19–44). Edward Elgar Publishing.
- Barney, J. B. (1991). Special theory forum the resource-based model of the firm: origins, implications, and prospects. *Journal of Management*, 17(1), 97–98. <https://doi.org/10.1177/014920639101700107>
- Barney, J. B. (2001). Resource-based theories of competitive advantage: a ten-year retrospective on the resource-based view. *Journal of Management*, 27(6), 643–650. <https://doi.org/10.1177/014920630102700602>
- Blaschke, M. R., & Brosius, M. (2018). Digital platforms: balancing control and generativity. *39th International Conference on Information Systems (ICIS 2018)*. Association for Information Systems.
- Bosch. (2019). *Sustainability Report 2018*. Retrieved from https://assets.bosch.com/media/global/sustainability/reporting_and_data/2018/bosch-sustainability-report-2018-factbook.pdf
- Bosch. (2020). *Sustainability Report 2019*. Retrieved from https://assets.bosch.com/media/global/sustainability/reporting_and_data/2019/bosch-sustainability-report-2019-factbook.pdf
- Bose. (2020). *2019 Sustainability Report*. Retrieved from https://assets.bose.com/content/dam/Bose_DAM/Web/consumer_electronics/global/content_pages/corporate/about_us/sustainability/Sustainability-2019-refresh/pdf/Bose-2019-Sustainability-Report.pdf
- Böttcher, T. P., Rickling, L., Gmelch, K., Weking, J., & Krcmar, H. (2021). Towards the digital self-renewal of retail: the generic ecosystem of the retail industry. In *Proceedings of the 16th Internationale Tagung Wirtschaftsinformatik (WI2021)* (pp. 1–9). Essen, Deutschland.
- Boudreau, K. J., & Hagiu, A. (2009). Platform rules: multi-sided platforms as regulators. In A. Gawer (Ed.), *Platforms, Markets and Innovation* (pp. 163–191). Edward Elgar.
- Brundtland, G., Khalid, M., Agnelli, S., Al-Athel, S., Chidzero, B., Fadika, L., & de Botero, M. M. (1987). *Our common future ('Brundtland Report')*. USA: Oxford University Press.
- Buchanan, R. (1992). Wicked Problems in Design Thinking. *Design Issues*, 8(2), 5–21. <https://doi.org/10.2307/1511637>
- Budiono, F., Lau, S., & Tibben, W. (2018). Cloud computing adoption for E-commerce in developing countries: contributing factors and its implication for Indonesia. *PACIS 2018 Proceedings*. Retrieved from <https://aisel.aisnet.org/pacis2018/90>
- Can, W., & Yong-Quan, L. (2014). Research on a novel multi-agent negotiation model for E-commerce platform. In *7th International Conference on Intelligent Computation Technology and Automation* (pp. 492–495).
- Choi, S., Whinston, A. B., & Stahl, D. (1997). *The economics of electronic commerce*. Macmillan Computer Publishing.
- Corallo, A. (2007). The business ecosystem as a multiple dynamic network. In A. Corallo, G. Passiante, & A. Prencipe (Eds.), *The Digital Business Ecosystem* (pp. 11–32). Edward Elgar Publishing.
- Corallo, A., Passiante, G., & Prencipe, A. (2007). *The digital business ecosystem*. Edward Elgar Publishing.
- Coskun-Setirek, A., Carmela Annosi, M., Hurst, W., Dolfma, W., & Tekinerdogan, B. (2024). Architecture and governance of digital business ecosystems: a systematic literature review. *Information Systems Management*, 41(1), 58–90. <https://doi.org/10.1080/10580530.2023.2194063>

- Deufel, P., & Kemper, J. (2018). Online payment method selection: the habitual choice of deferring payment. In J. Pries-Heje, S. Ram, & M. Rosemann (Eds.), *Proceedings of the 39th International Conference on Information Systems (ICIS)* (pp. 1–17).
- Dowie, J., Henningsson, S., Kude, T., & Popp, K. M. (2017). Merging platform ecosystems in technology acquisitions: a governance perspective. In *25th European Conference on Information Systems (ECIS 2017)* (pp. 2301–2316).
- Eickhoff, M., Muntermann, J., & Weinrich, T. (2017). What do FinTechs actually do? A taxonomy of FinTech business models. In Y. J. Kim, R. Agarwal, & J. K. Lee (Eds.), *Proceedings of the International Conference on Information Systems (ICIS)* (pp. 1–19).
- Eisenhardt, K. M. (1989). Building theories from case study research. *The Academy of Management Review*, 14(4), 532–550. <https://doi.org/10.2307/258557>
- Eisenmann, T. R., Parker, G., & van Alstyne, M. (2009). Opening platforms: how, when and why? In A. Gawer (Ed.), *Platforms, Markets and Innovation* (pp. 131–162). Edward Elgar Publishing.
- eMarketer. (2024). *Retail Ecommerce Sales Worldwide, 2024–2027*. Retrieved from <https://www.emarketer.com/chart/265660/retail-ecommerce-sales-worldwide-2021-2027-trillions-change-of-total-retail-sales>
- Etsy. (2019). *SASB Disclosure 2018*. Retrieved from [https://s22.q4cdn.com/941741262/files/doc_downloads/impact-reporting/ETSY-12-31-2018-10K-Impact-Section-\(1\).pdf](https://s22.q4cdn.com/941741262/files/doc_downloads/impact-reporting/ETSY-12-31-2018-10K-Impact-Section-(1).pdf)
- Etsy. (2021a). *2021 SASB & TCFD disclosures*. Retrieved from https://s22.q4cdn.com/941741262/files/doc_downloads/2021-SASB-TCFD-Disclosures.pdf
- Etsy. (2021b). *Integrated Annual Report 2020*. Retrieved from https://s22.q4cdn.com/941741262/files/doc_financials/2020/ar/2020-Integrated-Annual-Report_final.pdf
- Etsy. (2021c). *SASB Disclosure 2020*. Retrieved from https://s22.q4cdn.com/941741262/files/doc_downloads/2021/03/2020-SASB-TCFD-Disclosures.pdf
- Evans, D. S., & Schmalensee, R. (2016). *Matchmakers. The new economics of multisided platforms*. Harvard Business Review Press.
- Gao, L., Han, J.-S., & Kum, H.-H. (2019). A review of the research on E-commerce ecosystems in China. *Journal of Digital Convergence*, 17(8), 141–148. <https://doi.org/10.14400/JDC.2019.17.8.141>
- Gawer, A. (2021). Digital platforms' boundaries: the interplay of firm scope, platform sides, and digital interfaces. *Long Range Planning*, 54(5), 102045. <https://doi.org/10.1016/j.lrp.2020.102045>
- Gawer, A., & Cusumano, M. A. (2008). How companies become platform leaders. *MIT Sloan Management Review*, 49(2), 28–35.
- Gawer, A., & Cusumano, M. A. (2014). Industry platforms and ecosystem innovation. *Journal of Production Innovation Management*, 31(3), 417–433. <https://doi.org/10.1111/jpim.12105>
- George, G., Schillebeeckx, S. J. D., & Liak, T. L. (2015). The management of natural resources: an overview and research agenda. *Academy of Management Journal*, 58(6), 1595–1613. <https://doi.org/10.5465/amj.2015.4006>
- Ghazawneh, A., & Henfridsson, O. (2013). Balancing platform control and external contribution in third-party development: the boundary resources model. *Information systems journal*, 23(2), 173–192. <https://doi.org/10.1111/j.1365-2575.2012.00406.x>
- Gleiss, A., Degen, K., & Pousttchi, K. (2023). Identifying the patterns: towards a systematic approach to digital platform regulation. *Journal of Information Technology*, 38(2), 180–201. <https://doi.org/10.1177/02683962221146803>
- Google. (2024). *Environmental Report 2023*. Retrieved from <https://www.gstatic.com/gumdrop/sustainability/google-2023-environmental-report.pdf>
- Gregor, S., Müller, O., & Seidel, S. (2013). Reflection, abstraction, and theorizing in design and development research. *21st European Conference on Information Systems (ECIS 2013)*.
- Hagiu, A., & Wright, J. (2015). Multi-sided platforms. *International Journal of Industrial Organization*, 43, 162–174. <https://doi.org/10.1016/j.ijindorg.2015.03.003>
- Hahn, R., & Kühnen, M. (2013). Determinants of sustainability reporting: a review of results, trends, theory, and opportunities in an expanding field of research. *Journal of Cleaner Production*, 59, 5–21. <https://doi.org/10.1016/j.jclepro.2013.07.005>
- Han, B. R., Chu, L. Y., Sun, T., & Wu, L. (2020). Commercializing the package flow: cross-sampling physical products through E-commerce warehouses. *41st International Conference on Information Systems (ICIS 2020)* (pp. 1–63). Association for Information Systems.
- Hein, A., Schrieck, M., Wiesche, M., & Krcmar, H. (2016). Multiple-case analysis on governance mechanisms of multi-sided platforms. In *Multikonferenz Wirtschaftsinformatik*. Ilmenau, Germany.
- Hermes, S., Pfab, S., Hein, A., Weking, J., Böhm, M., & Helmut Krcmar. (2020). Digital platforms and market dominance: insights from a systematic literature review and avenues for future research. *PACIS 2020 Proceedings*. Retrieved from <https://aisel.aisnet.org/pacis2020/42>
- Holsapple, C. W., & Singh, M. (2000). Electronic commerce: from a definitional taxonomy toward a knowledge-management view. *Journal of Organizational Computing and Electronic Commerce*, 10(3), 149–170. https://doi.org/10.1207/S15327744JOCE1003_01
- Hoppe, C., Schmelzer, R., Möller, F., & Schoormann, T. (2023). Data spaces as enablers for sustainability. In *Nachhaltige Wertschöpfungssysteme (NaWerSys2023)* (pp. 1325–1336). Berlin, Germany.
- Hoppe, C., Winkelmann, S., Schoormann, T., & Möller, F. (2024). Get ready for the future: capabilities for a circular economy in the automotive industry. *ECIS 2024 Proceedings*. Retrieved from https://aisel.aisnet.org/ecis2024/track17_greenis/track17_greenis/26
- Howard-Grenville, J., Buckle, S. J., Hoskins, B. J., & George, G. (2014). Climate change and management. *Academy of Management Journal*, 57(3), 615–623. <https://doi.org/10.5465/amj.2014.4003>
- Iansiti, M., & Levien, R. (2004). *The keystone advantage - what the new dynamics of business ecosystems mean for strategy, innovation, and sustainability*. Harvard Business School Publishing Corporation.
- Jakobsen, O. (2022). Why does UN's Sustainable Development Goals frequently end up in greenwashing – enlightened by black box theory. In L. L. Langergaard (Ed.), *Ethical Economy. New Economies for Sustainability* (pp. 39–50). Cham: Springer International Publishing.
- Jha, S. K., Pinsonneault, A., & Dubé, L. (2016). The evolution of an ICT platform-enabled ecosystem for poverty alleviation: the Case of eKutir. *MIS Quarterly*, 40(2), 431–445. <https://doi.org/10.25300/MISQ/2016/40.2.08>
- Jones, P., & Comfort, D. (2019). “Better retail, better world”: a commentary on British retailers and the sustainable development goals. *Journal of Public Affairs*, 19(2), e1910. <https://doi.org/10.1002/pa.1910>
- Jones, P., & Comfort, D. (2021). Leading European retailers and the Sustainable Development Goals. *Journal of Sustainability Research*, 3(1), e210001.
- Joshi, A., Neely, B., Emrich, C., Griffiths, D., & George, G. (2015). Gender research in AMJ: an overview of five decades of empirical research and calls to action. *Academy of Management*

- Journal*, 58(5), 1459–1475. <https://doi.org/10.5465/amj.2015.4011>
- Ju, J., Liu, L., & Feng, Y. (2018). Designing an O2O citizen participation ecosystem for the sustainable governance of societies. *PACIS 2018 Proceedings*. Retrieved from <https://aisel.aisnet.org/pacis2018/225>
- Kang, C. (2021). Lawmakers, taking aim at big tech, push sweeping overhaul of antitrust. *The New York Times*. Retrieved from <https://www.nytimes.com/2021/06/11/technology/big-tech-antitrust-bills.html>
- Kaoud, E., Abdel-Aal, M. A., Sakaguchi, T., & Uchiyama, N. (2020). Design and optimization of the dual-channel closed loop supply chain with E-commerce. *Sustainability*, 12(23), 1–21. <https://doi.org/10.3390/su122310117>
- Kawa, A., & Walesiak, M. (2019). Marketplace as a key actor in e-commerce value networks. *LogForum*, 15(4), 521–529. <https://doi.org/10.17270/J.LOG.2019.351>
- Keller, R., Röhrich, F., Schmidt, L., & Fridgen, G. (2019). Sustainability's coming home: preliminary design principles for the sustainable smart district. *Wirtschaftsinformatik 2019 Proceedings*. Retrieved from <https://aisel.aisnet.org/wi2019/track12/papers/4>
- Ketter, W., Schroer, K., & Valogianni, K. (2023). Information systems research for smart sustainable mobility: a framework and call for action. *Information Systems Research*, 34(3), 1045–1065. <https://doi.org/10.1287/isre.2022.1167>
- Kotlarsky, J., Oshri, I., & Sekulic, N. (2023). Digital sustainability in information systems research: conceptual foundations and future directions. *Journal of the Association for Information Systems*, 24(4), 936–952. <https://doi.org/10.17705/1jais.00825>
- Kwak, J., Zhang, Y., & Yu, J. (2019). Legitimacy building and e-commerce platform development in China: the experience of Alibaba. *Technological Forecasting and Social Change*, 139, 115–124. <https://doi.org/10.1016/j.techfore.2018.06.038>
- Lashitew, A. A. (2021). Corporate uptake of the Sustainable Development Goals: mere greenwashing or an advent of institutional change? *Journal of International Business Policy*, 4(1), 184–200. <https://doi.org/10.1057/s42214-020-00092-4>
- Lauffer, W. S. (2003). Social accountability and corporate greenwashing. *Journal of Business Ethics*, 43, 253–261. <https://doi.org/10.1023/A:1022962719299>
- Lee, J. S., Pries-Heje, J., & Baskerville, R. (2011). Theorizing in design science research. In H. Jain, A. P. Sinha, & P. Vitharana (Eds.), *Service-Oriented Perspectives in Design Science Research* (pp. 1–16). Springer.
- Lee, S., Lee, S. Y., & Ryu, M. H. (2019). How much are sellers willing to pay for the features offered by their e-commerce platform? *Telecommunications Policy*, 43(10), 101832. <https://doi.org/10.1016/j.telpol.2019.101832>
- LEGO. (2022). *Sustainability Progress 2021*. Retrieved from https://www.lego.com/cdn/cs/aboutus/assets/blt15f6010332752196/The_LEGO_Group_SustainabilityProgressReport2021.pdf
- Lehner, M. (2015). Translating sustainability: the role of the retail store. *International Journal of Retail & Distribution Management*, 43(4/5), 386–402. <https://doi.org/10.1108/IJRDM-02-2014-0013>
- Leong, C., Pan, S. L., Newell, S., & Cui, L. (2016). The emergence of self-organizing E-commerce ecosystems in remote villages of China: a tale of digital empowerment for rural development. *MIS Quarterly*, 40(2), 475–484. <https://doi.org/10.25300/MISQ/2016/40.2.11>
- Liu, J., Kauffman, R. J., & Ma, D. (2015). Competition, cooperation, and regulation: Understanding the evolution of the mobile payments technology ecosystem. *Electronic Commerce Research and Applications*, 14(5), 372–391. <https://doi.org/10.1016/j.elerap.2015.03.003>
- Llamzon, R., Tan, F., Ractham, P., Kaewkitipong, L., & Mouzaki, K. (2020). Ecosystem governance in healthcare services: case studies of innovation communities in ASEAN. *PACIS 2020 Proceedings*. Retrieved from <https://aisel.aisnet.org/pacis2020/117>
- Ma, W., Zhao, C., Ke, H., & Chen, Z. (2020). Retailer's return policy in the presence of P2P secondary market. *Electronic Commerce Research and Applications*, 39, 100899. <https://doi.org/10.1016/j.elerap.2019.100899>
- Maibaum, F., Kriebel, J., & Foege, J. (2024). Selecting textual analysis tools to classify sustainability information in corporate reporting. *Decision Support Systems*, 183, 114269. <https://doi.org/10.1016/j.dss.2024.114269>
- Malhotra, A., Melville, N. P., & Watson, R. T. (2013). Spurring impactful research on information systems and environmental sustainability. *MIS Quarterly*, 37(4), 1265–1274. <https://doi.org/10.25300/MISQ/2013/37/3A4.3>
- Mangiaracina, R., Marchet, G., Perotti, S., & Tumino, A. (2015). A review of the environmental implications of B2C e-commerce: a logistics perspective. *International Journal of Physical Distribution & Logistics Management*, 45(6), 565–591. <https://doi.org/10.1108/IJPDLM-06-2014-0133>
- Mayring, P. (2014). *Qualitative content analysis: theoretical foundation, basic procedures and software solution*. Klagensfurt
- McIntyre, D. P., & Srinivasan, A. (2017). Networks, platforms, and strategy: emerging views and next steps. *Strategic Management Journal*, 38(1), 141–160. <https://doi.org/10.1002/smj.2596>
- McRae, C., Annosi, M., & Dubé, L. (2022). Tracing digital transformation pathways from subsistence farming to equitable and sustainable modern society: revisiting the eKutir ICT platform-enabled ecosystem as an interstitial space. *ICIS 2022 Proceedings*. Retrieved from https://aisel.aisnet.org/icis2022/soc_impact_is/soc_impact_is/8
- Melville, N. (2010). Information systems innovation for environmental sustainability. *MIS Quarterly*, 34(1), 1–21. <https://doi.org/10.2307/20721412>
- Microsoft. (2018). *Sustainability Report 2017*. Retrieved from https://assets.bosch.com/media/global/sustainability/reporting_and_data/2017/bosch-sustainability-report-2017.pdf
- Microsoft. (2023). *2022 environmental sustainability report*. Retrieved from <https://query.prod.cms.rt.microsoft.com/cms/api/am/binary/RW15mgm>
- Mishra, S., & Tripathi, A. R. (2020). Literature review on business prototypes for digital platform. *Journal of Innovation and Entrepreneurship*, 9(1), 1–19. <https://doi.org/10.1186/s13731-020-00126-4>
- Moore, J. F. (1993). Predators and prey: a new ecology of competition. *Harvard business review*, 71(3), 75–86. Retrieved from <https://hbr.org/1993/05/predators-and-prey-a-new-ecology-of-competition>
- Moore, J. F. (1996). *The death of competition: leadership & strategy in the age of business ecosystems*. HarperCollins.
- Nambisan, S. (2013). Information technology and product/service innovation: a brief assessment and some suggestions for future research. *Journal of the Association for Information Systems*, 14(4), 215–226. <https://doi.org/10.17705/1jais.00327>
- New York Post. (2021). Amazon warehouse destroys 130,000 unsold items per week. Retrieved from <https://nypost.com/2021/06/22/amazon-warehouse-destroys-130k-unsold-items-per-week-report/>
- Otto, B. (2011). Data governance. *Business & Information Systems Engineering*, 3(4), 241–244. <https://doi.org/10.1007/s12599-011-0162-8>
- Parker, G., & van Alstyne, M. (2016). Platform strategy. In M. Augier & D. J. Teece (Eds.), *The Palgrave Encyclopedia of Strategic Management* (pp. 1–9). Palgrave Macmillan UK.

- Parker, G., van Alstyne, M. W., & Choundary, S. (2016). *Platform revolution: how networked markets are transforming the economy and how to make them work for you*. W. W. Norton & Company.
- Parmar, B. L., Freeman, R. E., Harrison, J. S., Wicks, A. C., Purnell, L., & de Colle, S. (2010). Stakeholder theory: the state of the art. *The Academy of Management Annals*, 4(1), 403–445. <https://doi.org/10.1080/19416520.2010.495581>
- Peng, L., Wu, J.-H., Chen, Y.-C., Cheng, C., & Li, Q. (2019). The performance and value creation of E-commerce ecosystems in rural China: a perspective of systems theory. *PACIS 2019 Proceedings*. Retrieved from <https://aisel.aisnet.org/pacis2019/215>
- Popp, J., Milward, H. B., MacKean, G., Casebeer, A., & Lindstrom, R. (2014). Inter-organizational networks: a review of the literature to inform practice. *IBM Center for the Business of Government*.
- Pucker, K. P. (2021). Overselling sustainability reporting. *Harvard Business Review* (May-June), 1–12.
- Rao, P., Balasubramanian, S., Vihari, N., Jabeen, S., Shukla, V., & Chanchaichujit, J. (2021). The e-commerce supply chain and environmental sustainability: an empirical investigation on the online retail sector. *Cogent Business & Management*, 8(1). <https://doi.org/10.1080/23311975.2021.1938377>
- Recker, J., ZeiB, R., & Müller, M. (2024). iRepair or I Repair? A dialectical process analysis of control enactment on the iPhone repair aftermarket. *MIS Quarterly*, 48(1), 321–346. <https://doi.org/10.25300/MISQ/2023/17511>
- Reillier, L. C., & Reillier, B. (2017). *Platform strategy. How to unlock the power of communities and networks to grow your business*. Routledge.
- Revinova, S. (2021). E-commerce effects for the sustainable development goals. *SHS Web of Conferences*, 114, 1013. <https://doi.org/10.1051/shsconf/202111401013>
- Rochet, J., & Tirole, J. (2003). Platform competition in two-sided markets. *Journal of the European Economic Association*, 1(4), 990–1029. <https://doi.org/10.1162/154247603322493212>
- Rosemann, M., Ostern, N., Voss, M., & Bandara, W. (2023). Benevolent business processes - design guidelines beyond transactional value. In C. Di Francescomarino, A. Burattin, C. Janiesch, & S. Sadiq (Eds.), *Lecture notes in computer science, Business process management. 21st international conference, BPM 2023, Utrecht, The Netherlands, September 11-15, 2023 : proceedings* (Vol. 14159, pp. 447–464). Cham: Springer. Retrieved from https://doi.org/10.1007/978-3-031-41620-0_26
- Ruiz-Real, J., Uribe-Toril, J., Gázquez-Abad, J., & de Pablo Valenciano, J. (2019). Sustainability and retail: analysis of global research. *Sustainability*, 11(1), 14. <https://doi.org/10.3390/su11010014>
- Sachs, J. D., Schmidt-Traub, G., Mazzucato, M., Messner, D., Nakicenovic, N., & Rockström, J. (2019). Six transformations to achieve the Sustainable Development Goals. *Nature Sustainability*, 2(9), 805–814. <https://doi.org/10.1038/s41893-019-0352-9>
- Salesforce. (2019). *FY18 stakeholder impact report*. Retrieved from https://www.salesforce.com/content/dam/web/en_us/www/documents/reports/sustainability-FY18-stakeholder-impact-report.pdf
- Salesforce. (2020). *FY20 stakeholder impact report*. Retrieved from https://www.salesforce.com/content/dam/web/en_us/www/documents/white-papers/FY20-stakeholder-impact-report.pdf
- SanMiguel, P., Pérez-Bou, S., Sádaba, T., & Mir-Bernal, P. (2021). How to communicate sustainability: from the corporate web to E-commerce. The case of the fashion industry. *Sustainability*, 13(20), 11363. <https://doi.org/10.3390/su132011363>
- Santos, F. M., & Eisenhardt, K. M. (2005). Organizational boundaries and theories of organization. *Organization Science*, 16(5), 491–508. <https://doi.org/10.1287/orsc.1050.0152>
- Sasaki, H. (2018). Positioning of green information systems and technology from an ecosystem perspective. *PACIS 2018 Proceedings*. Retrieved from <https://aisel.aisnet.org/pacis2018/31>
- Satariano, A. (2020). Big fines and strict rules unveiled against ‘Big Tech’ in Europe. *The New York Times*. Retrieved from <https://www.nytimes.com/2020/12/15/technology/big-tech-regulation-europe.html>
- Schaltegger, S., Freund, F. L., & Hansen, E. G. (2012). Business cases for sustainability: the role of business model innovation for corporate sustainability. *International Journal of Innovation and Sustainable Development*, 6(2), 95. <https://doi.org/10.1504/IJISD.2012.046944>
- Schirmacher, N. B., Ondrus, J., & Kude, T. (2017). Launch strategies of digital platforms: platforms with switching and non-switching users. In *25th European Conference on Information Systems (ECIS 2017)* (Vol. 2017, pp. 658–673).
- Schoormann, T., Strobel, G., Möller, F., & Petrik, D. (2021). Achieving sustainability with artificial intelligence—a survey of information systems research. *42st International Conference on Information Systems (ICIS 2021)*. Association for Information Systems.
- Schoormann, T., Stadtländer, M., & Knackstedt, R. (2022). Designing business model development tools for sustainability—a design science study. *Electronic Markets*, 32(2), 645–667. <https://doi.org/10.1007/s12525-021-00466-3>
- Schoormann, T., Strobel, G., Möller, F., Petrik, D., & Zschech, P. (2023). Artificial intelligence for sustainability—a systematic review of information systems literature. *Communications of the Association for Information Systems*, 52, 199–237. <https://doi.org/10.17705/ICAIS.05209>
- Schreier, M. (2012). *Qualitative content analysis in practice*. Sage.
- Schroeder, P., Anggraeni, K., & Weber, U. (2019). The relevance of circular economy practices to the Sustainable Development Goals. *Journal of Industrial Ecology*, 23(1), 77–95. <https://doi.org/10.1111/jiec.12732>
- Schütte, R. (2011). *Modellierung von Handelsinformationssystemen. Kumulative Habilitationsschrift*. Münster: Westfälische Wilhelms-Universität Münster.
- Seidel, S., vom Brocke, J., & Recker, J. (2011). Call for action: investigating the role of business process management in green IS. *Sprouts: Working Papers on Information Systems*, 11.
- Seidel, S., Recker, J., & vom Brocke, J. (2014). Sensemaking and sustainable practicing: functional affordances of information systems in green transformations. *MIS Quarterly*, 37(4), 1275–1299. <https://doi.org/10.25300/MISQ/2013/37.4.13>
- Sitoh, M., Pan, S., & Cui, L. (2014). The roles of opportunity processes in a social business model: insights from China’s e-commerce villages. *ICIS 2014 Proceedings*. Retrieved from <https://aisel.aisnet.org/icis2014/proceedings/EBusiness/I>
- Stanley, C. (2020). *Independent assessment of external sustainability certifications and standards for inclusion in the Climate Pledge Friendly Program*. Retrieved from <https://sustainability.aboutamazon.com/cpf-anthesis-assessment.pdf>
- Staub, N., Haki, K., Aier, S., & Winter, R. (2022). Governance mechanisms in digital platform ecosystems: addressing the generativity-control tension. *Communications of the Association for Information Systems*, 51(1), 906–939. <https://doi.org/10.17705/ICAIS.05137>
- Taani, I., & Faik, I. (2019). Resilience of technology-mediated healthcare ecosystems: a relational coordination perspective. *ICIS 2019 Proceedings*. Retrieved from https://aisel.aisnet.org/icis2019/is_health/is_health/10
- Tanjim-Al-Akib, M., Ashik, L. K., Hosne-Al-Walid, & Chowdhury, K. (2016). User-modeling and recommendation based on mouse-tracking for e-commerce websites. In *2016 19th International Conference on Computer and Information Technology (ICCIT)*. IEEE.

- Teece, D. J. (2007). Explicating dynamic capabilities: the nature and microfoundations of (sustainable) enterprise performance. *Strategic Management Journal*, 28(13), 1319–1350. <https://doi.org/10.1002/smj.640>
- Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal*, 18(7), 509–533. [https://doi.org/10.1002/\(SICI\)1097-0266\(199708\)18:7%3c509::AID-SMJ882%3e3.0.CO;2-Z](https://doi.org/10.1002/(SICI)1097-0266(199708)18:7%3c509::AID-SMJ882%3e3.0.CO;2-Z)
- Teller, C., & Elms, J. (2010). Managing the attractiveness of evolved and created retail agglomerations formats. *Marketing Intelligence & Planning*, 28(1), 25–45. <https://doi.org/10.1108/0263450101014598>
- Tian, L., Vakharia, A. J., Tan, Y., & Xu, Y. F. (2018). Marketplace, reseller, or hybrid: strategic analysis of an emerging E-commerce model. *Production and Operations Management*, 27(8), 1595–1610. <https://doi.org/10.1111/poms.12885>
- Tim, Y., Cui, L., & Sheng, Z. (2021). Digital resilience: how rural communities leapfrogged into sustainable development. *Information Systems Journal*, 31(2), 323–345. <https://doi.org/10.1111/isj.12312>
- Timmers, P. (1998). Business models for electronic markets. *Electronic Markets*, 8(2), 3–8. <https://doi.org/10.1080/10196789800000016>
- Tiwana, A. (2014). *Platform ecosystems. Aligning architecture, governance, and strategy*. Waltham: Morgan Kaufman.
- Tiwana, A., Konsynski, B., & Bush, A. A. (2010). Research commentary —platform evolution: coevolution of platform architecture, governance, and environmental dynamics. *Information Systems Research*, 21(4), 675–687. <https://doi.org/10.1287/isre.1100.0323>
- Trieu, V.-C., & Lin, F.-R. (2021). Designing local food service ecosystem for sustainability: an agent-based social simulation approach based on service-dominant logic. *Hawaii International Conference on System Sciences 2021 (HICSS-54)*. Retrieved from https://aisel.aisnet.org/hicss-54/da/service_science/2
- 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>
- Turban, E., Whiteside, J., King, D., & Outland, J. (2017). *Introduction to electronic commerce and social commerce* (4th ed.). Springer Texts in Business and Economics. Cham: Springer International Publishing.
- UNDP. (2023). *Sustainable Development Goals | United Nations Development Programme*. Retrieved from <https://www.undp.org/sustainable-development-goals>
- United Nations. (2015). *Transforming our world: the 2030 Agenda for Sustainable Development*. Retrieved from https://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E
- United Nations. (2021). *The Sustainable Development Goals report 2021*. Retrieved from <https://unstats.un.org/sdgs/report/2021/The-Sustainable-Development-Goals-Report-2021.pdf>
- van Aken, J. E. (2004). Management research based on the paradigm of the design sciences: the quest for field-tested and grounded technological rules. *Journal of Management Studies*, 41(2), 219–246. <https://doi.org/10.1111/j.1467-6486.2004.00430.x>
- Vargo, S. L., Maglio, P. P., & Akaka, M. A. (2008). On value and value co-creation: a service systems and service logic perspective. *European Management Journal*, 26(3), 145–152. <https://doi.org/10.1016/j.emj.2008.04.003>
- Walmart. (2018). *2017 global responsibility report*. Retrieved from <https://corporate.walmart.com/content/dam/corporate/documents/purpose/environmental-social-and-governance-report-archive/wmt-2017-grr-report-final.pdf>
- Walmart. (2019). *2018 global responsibility report*. Retrieved from <https://corporate.walmart.com/content/dam/corporate/documents/purpose/environmental-social-and-governance-report-archive/wal-071-2018-grr-full-book1.pdf>
- Walmart. (2021a). *2020 environmental, social and governance report*. Retrieved from <https://corporate.walmart.com/content/dam/corporate/documents/purpose/environmental-social-and-governance-report-archive/wal-071-2018-grr-report-final.pdf>
- Walmart. (2021b). *Walmart environmental, social and governance report 2020*. Retrieved from <https://corporate.walmart.com/media-library/document/2020-environmental-social-and-governance-report-v-proxyDocument?id=0000017a-85af-d7dc-ad7a-bfaf6cd70000>
- Walmart. (2022). *Environmental, social and governance: FY2021 summary*. Retrieved from <https://corporate.walmart.com/content/dam/corporate/documents/purpose/environmental-social-and-governance-report-archive/walmart-2021-esg-annual-summary.pdf>
- Wang, Y. Y., Yu, Z. Q., Shen, L., & Dong, W. Q. (2021). E-commerce supply chain models under altruistic preference. *MATHEMATICS*, 9(6). <https://doi.org/10.3390/math9060632>
- Wareham, J., Fox, P. B., & Giner, J. L. C. (2014). Technology ecosystem governance. *Organization Science*, 25(4), 1195–1215. <https://doi.org/10.1287/orsc.2014.0895>
- Wood, S. L., Jones, S. K., Johnson, J. A., Brauman, K. A., Chaplin-Kramer, R., Fremier, A., & DeClerck, F. A. (2018). Distilling the role of ecosystem services in the Sustainable Development Goals. *Ecosystem Services*, 29, 70–82. <https://doi.org/10.1016/j.ecoser.2017.10.010>
- Wulfert, T., & Karger, E. (2022). Shaping digital platforms in E-Commerce: Developing an architecture framework. *PACIS 2022 Proceedings*. Retrieved from <https://aisel.aisnet.org/pacis2022/77>
- Wulfert, T., & Schütte, R. (2022). Retailer's dual role in digital marketplaces: reference architectures for retail information systems. *SN computer science*, 3(206), 1–17. <https://doi.org/10.1007/s42979-022-01098-w>
- Wulfert, T., Seufert, S., & Leyens, C. (2021). Developing multi-sided markets in dynamic electronic commerce ecosystems - towards a taxonomy of digital marketplaces. In *54rd Hawaii International Conference on System Sciences (HICSS 2021)*.
- Wulfert, T., Woroch, R., Strobel, G., Seufert, S., & Möller, F. (2022). Developing design principles to standardize E-commerce ecosystems: a systematic literature review and multi-case study of boundary resources. *Electronic Markets*, 32(3), 1–30. <https://doi.org/10.1007/s12525-022-00558-8>
- Wulfert, T., Woroch, R., Strobel, G., Schoormann, T., & Banh, L. (2023). Unboxing the role of E-commerce ecosystems to address grand challenges. In *Proceedings of the 31st European Conference on Information Systems (ECIS 2023)* (pp. 1–21). Kristiansand, Norway.
- Yang, Z., Ou, C., & Zhou, Z. (2017). Investigating the impact of recommendation agents on E-commerce ecosystem. In *23rd Americas Conference on Information Systems (AMCIS 2017)* (pp. 1–5). Association for Information Systems.
- Yen, B., Wong, G. (2019) Case Study: Cainiao and JD.com Leading Sustainability Packaging in China. *ICEB 2019 Proceedings (Newcastle Upon Tyne, UK)*. Retrieved from <https://aisel.aisnet.org/iceb2019/18>
- Yi, X., & Ming, X. (2011). Study on competitive advantage and construction strategy of E-commerce ecosystem. In *2011 Fourth International Conference on Business Intelligence and Financial Engineering* (pp. 207–210). IEEE.
- Yin, R. K. (2018). *Case study research: design and methods* (6th ed.). Sage.
- Yue, L., Tan, B., & Cui, L. (2016). The development, enactment and social implications of digital entrepreneurship: insights from a rural Chinese village. *ICIS 2016 Proceedings*. Retrieved from <https://aisel.aisnet.org/icis2016/EBusiness/Presentations/19>
- Zeiss, R., Ixmeier, A., Recker, J., & Kranz, J. (2021). Mobilising information systems scholarship for a circular economy: review, synthesis, and directions for future research. *Information Systems Journal*, 31(1), 148–183. <https://doi.org/10.1111/isj.12305>
- Zwass, V. (1996). Electronic commerce: structures and issues. *International Journal of Electronic Commerce*, 1(1), 3–23. <https://doi.org/10.1080/10864415.1996.11518273>