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EDITORIAL

Electronic Markets on sustainability

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What could be a more appropriate topic for the final issue of Electronic Markets' (EM) 30th anniversary volume than sustainability? Although the journal itself has steadily grown over three decades and published numerous articles on various aspects of sustainability, this issue now includes the first special theme section on sustainability. The number of articles on the topic may be explained with the fascinating nature of sustainability: on the one hand sustainability is an inherently positive goal and it is hard to imagine who could be against something being sustainable. On the other hand the term is applied with various contextual interpretations. This is summarized spot on in the United Nations agenda for sustainable development, which aims to make the world a better place (UN 2015) and mentions the dimensions of the triple bottom line (TBL), whereas sustainability has economic, ecologic and social facets (profits, planet, people). This suggests that measures of sustainability are inherently linked with the attempt to at least maintain a specific state in one or all three dimensions and also comprises the endeavor to improve on them. Continuity and advancement or the desire to exceed "business as usual" attitudes (Lazlo and Lazlo 2011) are thus at the heart of sustainability. To complement the preface of the guest editors of the special issue, the following aims to shed light on the relationship between sustainability and the field of electronic markets.

Electronic market perspectives on sustainability

Due to the broad nature of sustainability, several articles in EM are related to questions of sustainability. A simple search of EM articles included in Springer Link since 2009 using the key word "sustainability" yielded 52 hits. After removing six prefaces that referenced to articles that were already included in the search and after removing seven articles which did not elaborate on or only included sustainability in the reference section as well as a backward search yielding two articles on the term stability, a set of 41 articles remained. They point at several relationships between the terms "electronic market" and "sustainability", which lead to five clusters or perspectives (see Table 1).

The first perspective relates to the *economic* dimension of electronic markets. From a phenomenological macroeconomic view electronic markets may be seen as digital infrastructures where buyers and sellers interact as well as a competitive form of how allocation (or coordination) among buyers and sellers occurs. Electronic markets in this sense emerged in the 1970s and were sustainable since they enjoyed an impressive diffusion. Their evolution was driven by the reduction of economic transactions costs and culminated in the "move-to-the-market" hypothesis, which predicts electronic markets to become dominant forms of coordinating economic activity (Wigand 2011, Alt 2020). Today, the most big tech companies pursue centralized platform businesses and even decentralized electronic marketplaces are spreading. In a more microeconomic sense, electronic markets are business models, which include the platform provider as well as other service providers on the platform. Following the understanding in management literature, a sustainable business model is able to achieve and to maintain a competitive advantage for some time even in contested environments. The time period itself is not fixed since "it is not the period of calendar time that defines the existence of a sustained competitive advantage, but the inability of current and potential competitors to duplicate that strategy that makes a competitive advantage sustained" (Barney 1991, p. 103). Like any business model, competitive advantage originates from a compelling value proposition that offers benefits to the participants of an electronic platform (e.g. customers, suppliers, provider, investors). In particular, the economic dimension refers to the financial viability or stability where (expected) revenues of the marketplace need to exceed the operating costs in the longer term. As Cusumano (2020, p. 23) phrased it "platformizing a bad

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Table 1 Dimensions of sustainability and contributions in Electronic Markets since 2009

Aspects of sustainability	Articles in EM with subtopics
1. Economic sustainability	
Economic form of coordination	Wigand 2011, Alt 2020
Viability of electronic markets	In general (de Reuver et al. 2009; Akter et al. 2010; Daas et al. 2013; Moellers et al. 2019; Riasanow et al. 2020; Szopinski et al. 2020)
	Adequate ROI arrangements (Sharma and Gutiérrez 2010), long-term vs. short-term strategic orientation (Solaimani et al. 2013; Loukis et al. 2016; Im et al. 2020; Athanasopoulou and de Reuver 2020)
	Adequate value allocation among participants (Haile and Altmann 2016; Bañares and Altmann 2018; Blaschke et al. 2019; Xie et al. 2019)
	Sustainable auction mechanism (Li et al. 2017; Derks et al. 2018; Hong et al. 2020)
Critical mass of electronic markets	Positive network effects (Alt 2019; Alt 2020)
	Continued rather than one-time use (Akter et al. 2013; Choi et al. 2019)
Adaptability of electronic markets	Im et al. 2020, Ujwary-Gil and Potoczek 2020
2. Environmental sustainability	
Business models for sustainability	Business model design and assessment (Bouwman et al. 2020, Gimpel et al. 2020, Wit and Pylak 2020)
	Research method (vom Brocke and Mädche 2019)
Smart energy business models	Dedrick et al. 2015, Kranz et al. 2015, Schwister and Fiedler 2015, Alt and Wende 2020, Paukstadt and Becker 2020, Weking et al. 2020
Resource efficiency in specific sectors	Hospitality industry (Sigala 2016; Mingotto et al. 2020; Nam et al. 2020)
	E-invoicing (Cuylen et al. 2016)
	Residential sector (Hopf et al. 2018)
	High-frequency trading (Stan 2018)
Reuse and recycling of goods	Willing et al. 2017, Dorfleitner et al. 2018, Hein et al. 2019, Bauer et al. 2020
3. Social sustainability	
Platforms in the health sector	Akter et al. 2010, Menschner et al. 2011, Sultan and Mohan 2013, Simons et al. 2014
User participation	Kollmann et al. 2020
Quality of life	Osterle 2020
4. Technological sustainability	
Reliable quality of service	Wulf and Zarnekow 2010, Weking et al. 2020
Long-term data access	Rechert et al. 2014, Hein et al. 2019
5. Systemic sustainability	
Stability of platform / market	Beimborn 2014, Kauffman et al. 2018
Stability of linked actors / markets	Alt and Klein 2011, Neuhofer et al. 2020

business will not make it a good business". Four examples are given in articles of EM:

- The analysis of the Bitcoin network expects "that each actor in an ecosystem is capable of generating a net cash flow in the long term. If one or more actors fail to do so, the network collapses and is unsustainable." (Derks et al. 2018, p. 322). In particular, the authors questioned the financial sustainability of the proof-of-work consensus mechanism, which is at the heart of business models relying on the Bitcoin protocol.
- An analysis of online shopping auctions points at the bidding rules as a source for sustainability. Li et al. (2017) observed that penny auctions were unsustainable since

their rule required bidders to pay even if their bids were not successful. This made repeated participation in these auctions unlikely and led to the disappearance of many platforms using this rule. An equal distribution of value among the participants is therefore mentioned in many contributions (e.g. Sharma and Gutiérrez 2010; Sultan and Mohan 2013; Haile and Altmann 2016; Xie et al. 2019).

- The economic sustainability of a digital platform inherently depends on positive network effects and the ability to reach a critical mass of transactions (e.g. Alt 2020). They determine a market's liquidity, which instead of referring to assets held in cash, is "a measure of a market's state or health" (Paddrik et al. 2017, p. 235) and denotes the availability of sufficient offers on both market sides.
- In competitive environments, sustaining liquidity also requires the ability to flexibly adapt the business model and to "react to market changes" (Im et al. 2020, p. 511). This confirms research on e-market sustainability, which recognizes that "market competition has a profound impact on the sustainability of B2B e-markets" (Zhao et al. 2009, p. 108). Ultimately, the literature on technological change suggests that due to the competition among existing and new contenders even the now dominating platform companies will not last forever and need to continuously reinvent themselves to remain sustainable (Alt and Zimmermann 2019).

The second perspective conceives sustainability in its *environmental* dimension and is rooted in the scarcity of natural resources. To reduce environmental deterioration, the ambitious concept of the circular economy is proposed, which relies on the 3R principles of reusing, reducing and recycling (Han et al. 2020). Although the concept it its entirety will be difficult to achieve (Parrique et al. 2019), electronic markets are important enablers in this context. Two main distinctions are necessary to assess the role of electronic markets (Römer et al. 2015): on the one hand, electronic markets are based on information systems that require natural resources for manufacturing as well as for operating and disposing of the computing systems. In this respect, the business model of an electronic market provider could posit to reuse existing computing power, to reduce consumption with energy efficient hardware and to recycle as much energy as possible. While this is referred to as green information technology ("Green IT"), the other area is green information systems ("Green IS"), which "are used to make other processes more sustainable" (Römer et al. 2015, p. 49). The field of Green IS has been recognized by IS researchers (e.g. Seidel et al. 2017), who declare that solutions are urgently needed (e.g. Gholami et al. 2016). Important issues are the efficient allocation of environmental resources via a common information infrastructure and market mechanisms. This opens a broad spectrum of possible business models in the domain of environmental sustainability (e.g. Bouwman et al. 2020; Gimpel et al. 2020). Among the examples are:

- Business models in the field of smart energy (Kranz et al. 2015; Schwister and Fiedler 2015; Paukstadt and Becker 2020) where electronic markets could enable smart grids (e.g. Dedrick et al. 2015), real time pricing to contain energy consumption (Han et al. 2020), the validation of clean energy resources (e.g. Weking et al. 2020) or the electronic trading of energy certificates (Alt and Wende 2020).
- Business models in other sectors that benefit from improved energy efficiency. EM papers have repeatedly dealt with the hospitality industry where smart tourism (e.g. Gretzel et al. 2015; Sigala 2016) could be used for competitive advantage, e.g. reduced waste or water preservation (e.g. Nam et al. 2020). However, studies on the digital rebound effect remind us that the gains will not always compensate the negative effects (e.g. Coroamă and Mattern 2019).
- Business models in the reuse and recycling of goods. Due to their multi-sidedness, most platforms in the sharing economy are electronic markets. They are found in the shared use of resources such as carsharing (Willing et al. 2017) or in numerous second-hand or resale markets (e.g. Bauer et al. 2020). These initiative help to reduce the ecological footprint, albeit not being able to fully compensate for it (Parrique et al. 2019).

The third perspective is *social* in nature and focuses on the human side with social capital and social equity. As summarized by Shaker (2015) social sustainability comprises measures such as the human and social wellbeing index as well as the quality of life index. In this sense, technologies such as sustainable wearables were described for improving the quality of individual life, social impact and social public interest (Lee et al. 2016). Similarly, social media platforms might serve to convey relational and societal core values such as justice or reciprocity (Calcagni et al. 2019) and virtual communities might form "groupings in which people are seen as mutually supportive rather than in competition" (Alexander 2000, p. 333). In her analysis of the Bled eConference proceedings, Pucihar (2020, p. 30) also observed that "the social aspect of business models […] has recently gained more importance as enterprises are nowadays urged to consider sustainability as a significant part of the development of their operations and business models". Despite the quality of life will strongly differ among individuals and will be hard to measure, the relevance of improving the human quality of life is assumedly undisputed. In the sample of EM articles, only a small number of contributions could be observed with an explicit emphasis on social sustainability. Among the examples are business models for (mobile) health platforms and services (e.g. Akter et al.

2010; Menschner et al. 2011; Sultan and Mohan 2013; Simons et al. 2014), the growth of more democratic and participatory cooperative business models via blockchain infrastructures (Kollmann et al. 2020) as well as the search for new intermediaries that support users in improving their quality of life in the long-term (eudaimonia) instead of continuously seeking (hedonic) short-term need satisfaction (Osterle 2020).

The fourth perspective is *technological* in nature. Although many authors equal technological sustainability with Green IT (e.g. Bolla et al. 2017; Han et al. 2020) as well as with a reliant and fault-tolerant operation of IS (e.g. Wulf and Zarnekow 2010; Weking et al. 2020), another stream links the term with usability, i.e. the human side of interacting with IT (Fuchs 2006). While this refers to information on electronic markets being accessed (or provided) by (human) users, the sustained access of data objects has been recognized as an aspect of an electronic market's interoperability. The latter is important in interorganizational settings since data objects and workflows might change over time and impede the exchange of information. In this respect, Rechert et al. (2014) suggested the digital preservation approach to secure continued access via an emulation-as-a-service architecture. The authors also see this as a contribution towards resilient business processes, which are still operational under changing conditions.

This leads to a fifth perspective, which is the *systemic sustainability* of an electronic market. It follows the observation that electronic markets are economic as well as technological in nature and that the interaction of many actors (i.e. sellers, buyers, intermediaries) reflects social patterns. The evolution in the field of financial markets has shown that the behavior of these multi-actor systems is not deterministic and may assume states that were not intended or foreseen by their creators or providers. Although crashes and shocks were present before electronic exchanges came to life in 1977 (see Economides and Schwartz 1995), the systemic risks in the financial system have remained and Paddrick et al. (2017, p. 224) state that "although the electronic order book and its rules (e.g. price-time priority) are relatively simple, the behavior of a market is complex, because it includes a large number of participants who interact with each other stochastically, making analysis difficult." They report that between 2006 and 2012 a total of 18,250 mini flash crashes were registered, which denote sudden sharp price changes. In fact, there is evidence that automation adds to this instability under certain circumstances. This is visible when human traders are substituted with machines. As noted by Nishimura (2010), about half of the trading volume in currency markets involved algorithmic trading and despite metrics on the stability, integrity and resilience of a market's microstructure were introduced to better monitor market behavior, algorithmic high-frequency trading may cause market freezes in certain conditions (e.g. when informed trading is present, see Bongaerts and van Achter 2014).

In view of the increased automation, networking and intelligence resulting from the convergence of powerful technologies (e.g. artificial intelligence, big data, distributed ledger technologies, internet of things), similar scenarios to the electronic financial markets may be observed in other software-defined application domains as well. Concerns that autonomously acting (smart) systems will develop their own dynamics are leading to the question of whether they may adapt themselves to become self-sustainable autonomous systems (e.g. Zheng et al. 2012). While it may be feasible for a single system to "survive" under changing conditions, the complexity rises substantially with the number of connected and interdependent systems. The implications are ambivalent since a stronger distributed system may involve higher risks (e.g. less control on participating actors) as well as lower risks (e.g. fault tolerance in systems like the Internet). Remarkably, this topic was already raised in the fourth issue of EM that was ever published. Back in 1992, Peter Addor elaborated in his article on the stability of electronic marketplaces and argued that the real-time communication among these marketplaces could render these systems more stable against anomalies than traditional "paper markets" (Addor 1992). Although such equilibria might occur if analogies of autopoietic system behavior are drawn to digital ecosystems (e.g. Briscoe et al. 2011), safeguards like regulatory measures should be considered to contain risks emanating from this interconnectedness (Alt and Klein 2011). Likewise artificial intelligence and metrics known from the stability of financial markets may be applied to control or even forecast the behavior of such autonomous systems.

Articles of present issue

In summary, the overview on sustainability sheds some light on the broad nature of topics in this field and the valuable role of electronic markets for achieving sustainability. Without doubt the five perspectives hold potential for several special issues and will not be covered in a single special issue. As mentioned by the guest editors of this special issue, the various dimensions of sustainablity are not mutually exclusive and "sustainability should not be separable and investigated in scientific silos considering only one dimension of sustainability" (Jabłoński et al. 2020). This is visible in business models, which are successful in the economic dimension when pursuing an ecological and/or social sustainability value proposition (e.g. the sustainability-oriented digital platform multinationals as described by Kolk and Ciulli 2020). This approach is also much in line with the call to overcome single-dimensional research perspectives (Clarke 2020) and the quest for more inclusive research perspectives in the field of sustainability (e.g. Bocken et al. 2019) towards a more systemic perspective also termed as quadruple bottom line

(Lazlo and Laszlo 2011). All three special issue papers mention the interaction of various TBL dimensions and are introduced in the preface of the guest editors Marek Jabłoński, Paul Timmers and Joseph Sarkis (Jabłoński et al. 2020). In addition, the present issue includes ten papers in the general research section, which may be clustered in two larger fields within the wider marketing context: six papers focus on the role of online reviews and four contributions on the success and adoption of e-commerce solutions.

- The first of the papers on online reviews is authored by Wei Liu, Zongshui Wang and Hong Zhao. In their "comparative study of customer relationship management research from East Asia, North America and Europe" they combine a quantitative bibliometric analysis of 1971 publications in the field of customer relationship management (CRM). They find that CRM studies differ depending on where they were conducted: eastern studies focused on developing CRM and western studies on the effects of CRM.
- The second paper analyzes how the amount of information provided in marketing campaigns influenced consumer decisions. Using the example of tourism websites in the UK and in Spain, José-Alberto Castañeda, Dolores M. Frías-Jamilena, Miguel A. Rodríguez-Molina and Adam Jones ascertain experimentally that the amount of information displayed in online campaigns and the information skill of consumers (i.e. digital literacy) are important to understand whether a campaign is effective.
- The third paper links to the question of information overload and shows the importance of images in online reviews. The authors Robert Zinko, Paul Stolk, Zhan Furner and Brad Almond conducted several web-based simulations in the hotel industry and analyzed factors, such as the impact of images, the trust in the review and the purchase intention. As mentioned in their paper's title "A picture is worth a thousand words", they show that pictures have a varying, but always a positive impact.
- The fourth paper on online reviews presents a solution that allows to identify specific topics in reviews to assess a review's usefulness. Using topic modeling, this approach by Vamsi Vallurupalli and Indranil Bose provides a valuable contribution to automatically monitoring customer feedback, to deriving information for marketing intelligence and to better selecting helpful content for customers seeking advice. The authors illustrate how they explore the topical composition of reviews in a case study using data from Yelp.
- The fifth paper is titled "May we buy your love?" and investigates the impact of offering monetary rewards for writing online reviews. The authors Ina Garnefeld, Sabrina Helm and Ann-Kathrin Grötschel assert that such incentives can almost double the likelihood of review writing, but also caution that this practice should be applied carefully. This is mainly due to several ambivalent psychological effects that follow the concept of positive reciprocity and influence the valence of an online review.
- Finally, the sixth paper focuses on the interdependence between the popularity of a product and its ratings. The author Rae Yule Kim observed the diffusion cycles of a broad sample of apps on the Google Playstore and found reviews to be more positive in the early phases. He argues that businesses should strive for continuous innovation and to constantly create "newness" to keep skeptics satisfied. Thus, he titled his research "The influx of skeptics: an investigation of the diffusion cycle effect on online review".

The four remaining papers in general research were summarized in a "wider e-commerce cluster", which in fact provides some link to the sustainability aspects introduced in the upper section of this editorial. Referring to the constant growth and their intent to remain competitive, motivating new as well as existing users are an important aspect in the economic dimension. The four papers are:

- "Effects of search engine advertising on user clicks, conversions, and basket choice" authored by Patrick Winter and Paul Alpar. The authors investigate how users react to ads being displayed in search engines by systematically distinguishing the possible decision options. Based on their experiment they conclude that search engine advertising (SEA) is mostly beneficial for the sellers and suggest that potential advertisers should apply an SEA balance sheet to determine whether or not they should bid for a certain keyword.
- "Nudging users into digital service solutions" by David Schneider, Johannes Klumpe, Martin Adams and Alexander Benlian. This contribution scrutinizes the role of electronic identification technologies (eID), which are a key element for numerous digital services. The authors investigate how nudging theory supports the adoption of e-government services. In their experiment they find that default options (e.g. an opt-out option) and social proofs (what other citizens have made in addition to what government recommends) to positively influence adoption.
- "Understanding continuance intention to use online to offline (O2O) apps: An expectation confirmation model with transaction cost". The authors Chin-Lung Hsu and Judy Chuan-Chuan Lin investigate the users' continuance intention to use and empirically test their model regarding the perception of O2O apps. They revealed that perceived benefits, satisfaction as well as transaction costs directly impact the usage intention and report differences between users of task-oriented and entertainment-oriented O2O apps.
- "Relationship approach to crowdfunding: How creators and supporters interact to enhance projects' success".

Based on data sets from three crowdfunding platforms in Israel, this research observes that in successful crowdfunding campaigns, the actors seeking funding (creators) are able to communicate with potential investors (supporters). To establish commitment and bonding, the authors Kalanit Efrat and Shaked Gilboa point at the need to establish relationships that convey shared values and emotional sentiments.

To sum up this editorial on sustainability, it should be noted that sustainability is nothing to be taken for granted. Preserving and improving requires investment, which also applies to the journal itself. The present issue was another strong community effort and a big thank you goes to the guest editors of the special issue section as well as to all the authors, editors and reviewers involved. From this perspective, a journal resembles a large family and EM is proud that many scholars have contributed over many years to the journal. It is therefore with great gratitude to acknowledge that JoonHo Ahn and Efraim Turban have terminated their service and Robert Kauffman has agreed to join EM's Advisory Board. In particular, it is difficult if long-term members pass away. It was with great sadness to learn that Rolf T. Wigand deceased this September. Rolf was an active and highly esteemed member of the journal since 1999. He contributed as an author of several research articles and was a senior editor since 2012. In 2015 he retired, but he remained active and only a few months ago he shared his experience with a state-of-the-art view on disintermediation (Wigand 2020), which was an important field of his research. His legacy in e-commerce, networked businesses and transaction cost theory will remain unforgotten as will his always positive mindset. We dedicate this issue to him.

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