A Co-creative Initiative Towards Open Data for Sustainable Business Practices

by Ebba Fahlgren, Shamima Haque, and Debadrita Panda

Image Credit | Sarah Dorweiler

Creating open data with ecosystems to maximize sustainable value creation.

✅ **INSIGHT | FRONTIER**   22 Jul 2024

With increasing prominence of global sustainability mandates in the corporate agenda, industrial firms are progressively aiming to perform eco-sensibly.[1] Inspired by the 'triple bottom line' philosophy,[2] such firms are broadening the 'thin' conceptualization of value from its conventional economic impetus to a 'holistic view of value' creation that is essentially sustainable.[3] The notion of sustainable value creation (SVC) integrates economic, social and environmental value forms to develop a 'wider value creation ecosystem'.[4] In pursuit of creating sustainable value through a decisive trade-off between 'maximizing positive and minimizing negative impacts', industrial firms are actively seeking out innovative opportunities to capture 'net-positive' value that is inclusive, long-term, and often boundary spanning.[5]

In this transition towards SVC, open data has garnered interest from practitioners lately as a promising yet underutilized resource that can generate unprecedented value.[6] Open data is defined as an "open publication of data collected and stored by organizations which is consented by laws to be made accessible to the public through data portal".[7] The primary aim of releasing open data is to offer the public, academia, industry, and other government entities unrestricted sources of new knowledge and a compelling value proposition. Investigators have asserted that open data boosts efficiency, encourages participation, fosters collaboration, enhances transparency, and drives economic growth and innovation.[8] It has emerged as an innovative and thoughtful approach for industrial firms intending to initiate their sustainable journey by exploring humble options, or for those charting new and innovative prospects for SVC.[9]

Our team of authors has been extensively collaborating with heavy industrial firms and their ecosystem partners to understand how open data initiatives can be harnessed to build sustainable capabilities in the Nordic industrial regions. Through in-depth interactions, interviews, and seminars, we have gained unique insights into the perceptual value gaps associated with making open data publicly accessible. Despite these hurdles, we have observed the resilience and strong commitment of these firms to develop a 'stakeholder-responsive' ecosystem towards open data. In this frontier, we share our key learnings to inspire any industrial firms who consider innovative value propositions using open data as a knowledge resource. We structure our discussion under two main sections. *First, we present what diverse forms of sustainable value that can be captured by repurposing data that is accessible and perpetually available in the public domain*. *Next, we present a process that industrial firms adopt to generate open data that finds meaningful usage among a multitude of stakeholders to facilitate the SVC*. This discussion will help practitioners to address the value perception paradoxes and maximize SVC.

Understanding the Context

In today's knowledge-driven economies, finding valuable information and discovering new insights are crucial for making smart decisions. As advanced technology and artificial intelligence change how businesses operate, the importance of turning data into useful knowledge and value has grown significantly.[8] Industrial firms exhibit varying levels of sustainability maturity. Some are just starting out, while others have already developed rigorous sustainable practices and are looking for new opportunities. Both groups heavily depend on data-informed decision-making to balance economic objectives vis-à-vis social and environmental responsibilities. They need high-quality data that is easy to understand, contextually relevant, timely, and reliable. By analyzing, visualizing, and linking this data for meaningful use, firms can support their sustainability endeavors, whether they are just beginning or looking for new avenues of growth.

Organizations that manage and publish open data typically have data stewards or committees working with many public agencies to select, audit, and validate data before making it public, following strict privacy, integrity, and confidentiality policies. However,

these organizations are often concerned about proper usage of the data by the users. This apprehension has led to an emphasis on strong public-private partnerships, engaging diverse stakeholders to gain sustainable insights from these data sources.[9]

In this setting, our team connected with professionals from large industrial firms interested in sharing their utilitarian data. We spoke with senior project managers, R&D engineers, data protection coordinators, sustainability officers, and innovation experts. These firms often produce a lot of data from their operations and innovation efforts and are now interested to publicize their data. Their goals include building customer trust, gaining a competitive edge through branding, fostering growth through community engagement, improving internal processes with benchmarking, and collaborating on innovative sustainable solutions.[10] They are motivated to 'publish with a purpose,' aiming to create sustainable value beyond just compliance.[11]

Adopting a co-creation approach, these firms are engaging their ecosystem partners in the process to generate open data and maximize SVC. We reached out to various partners, such as IT architects, open data specialists from research institutes, academic researchers, and urban-regional planners, conducting detailed interviews. These conversations helped us understand the ecosystem's requirements, including what users expect and hope to achieve with open data. During these discussions, we noticed significant differences in how providers (industrial firms) and users (ecosystem partners) perceive the value of open data. A summarized version of our findings is presented below for practitioners' reference.

1. **Value perception gap between data providers and data users:** There exists a value paradox describing an apprehension of the low level of perceived value added by open data. Data providers are reluctant to invest in open data initiatives without clear evidence of innovation potential and value captured, while users are wary of utilizing open data due to concerns over continuity, clarity, standardization, obsolescence, and accuracy.

2. **Tension between knowledge sharing and knowledge protection:** Whether to share knowledge for value creation or to protect it for value appropriation is the next contest.This paradox relates to degree of openness describing a situation in which firms seek to 'simultaneously share and protect their knowledge', to enhance the

development of innovations while concurrently ensuring their successful commercialization.

3. **Heterogeneity of data users' role:** To derive sustainable knowledge and value, open data requires contextualization and apt semantics, posing a challenge for data providers given the heterogeneous user base. The user communities differ in their roles and data literacy—knowledge, skills, and abilities— while interacting with open data portals, each having varying expectations and motivations. Beginners focus on browsing, filtering, and downloading; advanced users expect basic processing and visualizations; while expert users engage in advanced statistical analysis, interactive visualizations, and data linking for enhanced decision-making. This wide spectrum of user needs and capabilities creates a significant conundrum for data providers, who must cater to all levels without compromising data integrity.

This is why co-creation with the ecosystem is so important when industrial firms aim to generate and publish open data.

Creating Sustainable Value from Open Data

While the benefits of open data initiatives are reported to be substantial in academic researches, the fact remains that "open data has no value in itself; it only becomes valuable when it's used".[12] Upcoming are the various sustainable value dimensions which industrial firms extract from open data.

1. **Economic Values:** Open data fosters economic growth by enabling entrepreneurship, product/service innovation, and provide insights into market trends, consumption patterns, and technological advancements with potential commercialization prospects. This cultivates an innovation ecosystem enhancing industry competitiveness, attracting investment, and generating employment opportunities.[13] Open data facilitates in streamlining processes, optimizing operations, and identifying areas for improvement. In sectors like power, sharing data on consumption, distribution, and energy production facilitates informed decisions to optimize resource allocation, minimize costs, and reduce waste. It enables knowledge sharing, promotes best practices and standardization among stakeholders, leading to

cost reduction across supply chains. While initial investments are required, long-term benefits of consistent decision-making and well-defined processes outweigh the costs.

2. **Social Values:** Open data generates social value by promoting community engagement, collaboration, and innovation. Publicly accessible datasets across domains like public health, education, and transportation enable communities to address local challenges more effectively.[14] Stakeholders can leverage this data to develop solutions that enhance quality of life, such as optimizing public services, identifying health trends, and planning sustainable urban developments. Open data promotes transparency and accountability, encouraging public participation and trust in governance. This collective acumen empowers communities to proactively solve issues while supporting the creation of inclusive, data-driven solutions that benefit society holistically. By publicizing data access, open data initiatives promote social well-being and enable stakeholders to collectively address societal needs.

3. **Environmental Values:** Open data significantly contributes to environmental value creation by enabling enhanced monitoring and management, resource optimization, and sustainable innovation. Access to environmental datasets facilitates accurate and timely monitoring of ecological conditions like air quality, global warming, forest coverage, water resources, and biodiversity. This data empowers stakeholders to identify trends, predict changes, and respond proactively to emerging environmental issues. Stakeholders can leverage open data to optimize resource utilization, minimizing waste and environmental footprints. Again, open data fosters collaborative ideation, supporting the development of innovative green technologies and conservation strategies progressing towards resilient environment.
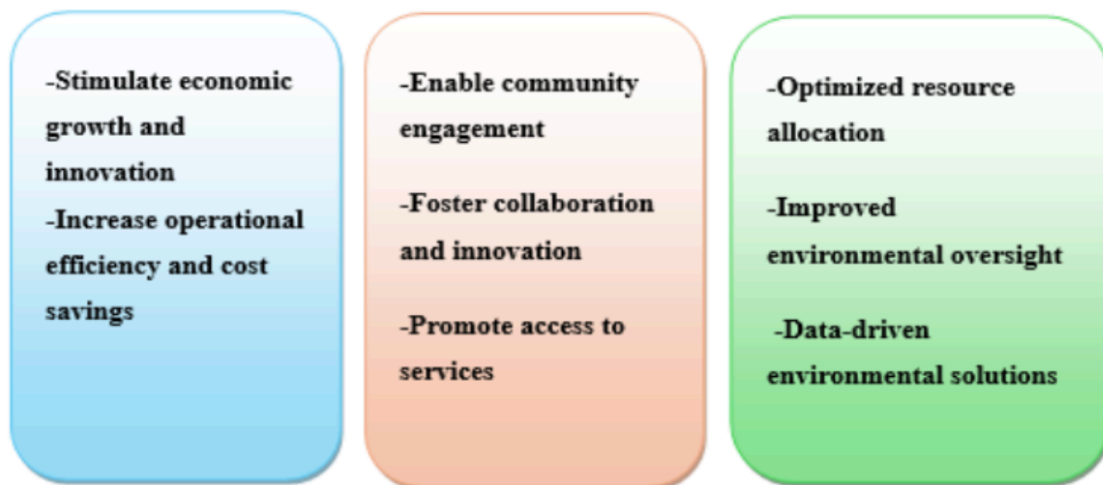
Figure 1: Extracting sustainable value from open data

Process of Generating Open Data: A Co-creative Approach

Next, we present how industrial firms, who are not legally obligated to provide open data, are adopting a demand-driven, participatory approach to open data creation and management. This co-creative perspective aims to capture the diverse sustainable values, both spatial and temporal, that stakeholders essentially seek from open data sources. We present the process that firms are pursuing:

1) Planning and initial assessments: The first phase encompasses activities that guide the industrial firm in making informed decisions about embarking on an open data initiative, ensuring its feasibility and alignment with the firm's objectives. Key business practices in this phase include:

a) Defining scope and objectives: Within this practice, the industrial firm outlines the initiative's goals, scope, and targeted data categories. Additionally, it identifies the intended audience/stakeholders/ecosystem, their expectations, and motivations for utilizing the open data. This facilitates a perceptual congruence between data providers and data users.

b) Data sorting and classification: This practice involves sorting the firm's existing data and previous requests from ecosystems, classifying data based on sensitivity and shareability, and conducting risk analyses for various strategic choices related to open data. Based on these risk-benefit assessments, firms can decide on selectively opening datasets while safeguarding sensitive information.

2) Implementation and promotion: The second phase aims to ensure the industrial firm understands how to structure data in appropriate formats, select an architecture type and promote open data initiatives that allows for future scalability and growth.

a) Data standards and formats: This business practice involves organizing and standardizing data formats for better value comprehension. It also includes creating data descriptions, which relate to the metadata that should accompany datasets. This aids multiple users in exploring, filtering, visualizing, and analyzing data for enhanced interpretation, evaluation, and feedback in accordance with value preferences.

b) Architecture: This practice involves selecting an appropriate data platform that not only facilitates data dissemination but can also integrate advanced AI capabilities for enhancing data linkages and knowledge extraction. After determining the requisite technology requirements, firms can proceed to initiate data accessibility and sharing/publishing processes.

c) Promotion: This practice encompasses two crucial activities, internal promotion of the open data concept within the organization and among ecosystem partners, as well as external promotion targeting previously identified user groups via the company's media channels. Adopting this dual promotional approach, firms can effectively raise awareness and generate buy-in for their open data initiatives, both internally and among their intended data users. This broadens the reach and facilitates the open data concept's dissemination, amplifying value creation opportunities across the firm's ecosystem.

3) Governance and maintenance: In the final phase, effective governance and maintenance practices are crucial. These practices foster ecosystem trust, ensure regulatory compliance for data protection, and maintain resilience and adaptability, ultimately maximizing the sustainable value derived from collaborative open data efforts.

a) Data Protection: This practice focuses on protecting data privacy, confidentiality, and ownership. It involves establishing clear policies and protocols for data handling, access controls, and security mechanisms to mitigate risks associated with unauthorized access, misuse, or data breaches.

b) Feedback and Scalability: This business practice includes scheduling data updates for quality and relevancy, assessing user feedback for modifications and adjustments and seeking scalable solutions. This iterative approach of data updates and user-driven refinements enables firms to scale their solutions dynamically, adapting to changing requirements while maintaining the quality and value of their open data resources. Sophisticated technologies, such as cloud computing, distributed data storage, and flexible architectures, should be integrated to support the expansion and evolution of open data platforms.
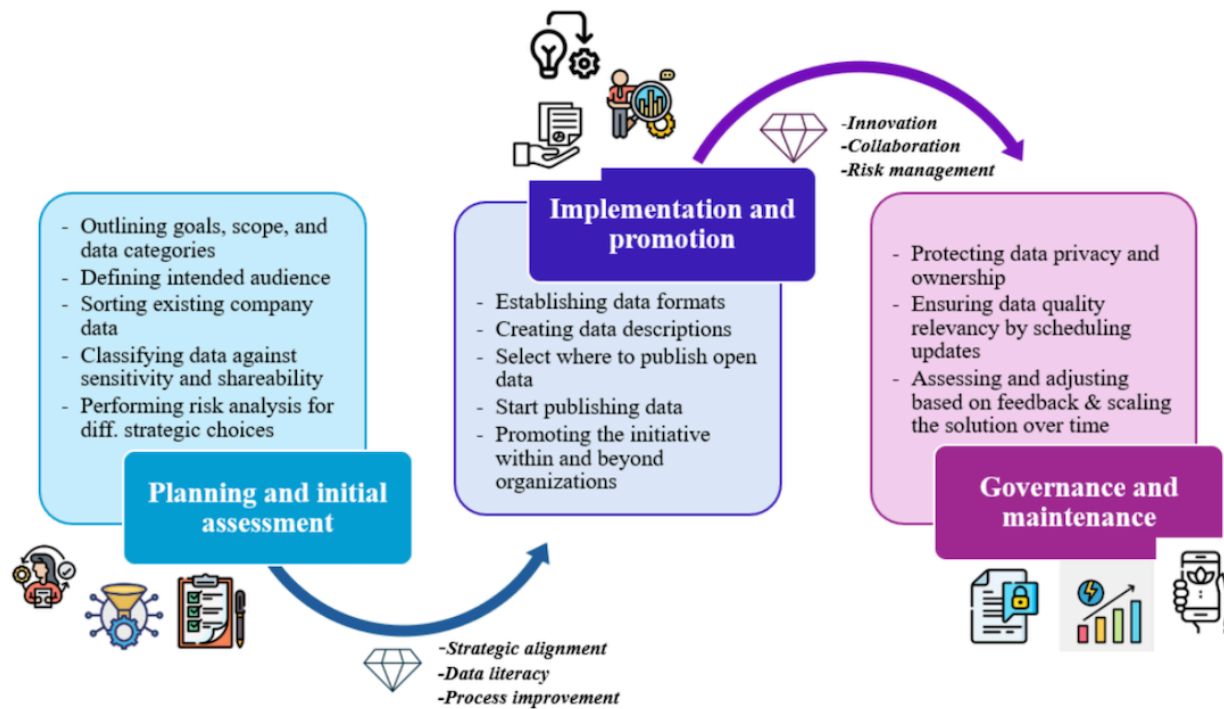
Figure 2: Process of generating open data

Concluding Remarks

Increasing the accessibility and shareability of open data presents great opportunities for creating sustainable value and fostering positive collaborations. For industrial firms to truly unlock the power of open data, they need to adopt an ecosystem-centric, co-creative approach that generates a cascading effect of value. By working together, firms as data producers and various ecosystem partners as data users can leverage collective intelligence, creating shared value that goes beyond individual organizations and boosts the broader environment. When data producers repurpose open data based on feedback and tailor it to meet stakeholder needs, open data can become an invaluable resource for extracting sustainable knowledge. By aligning on 'how', 'for whom', and 'what' value open data provides, firms can bridge perception gaps and maximize the benefits of open data.

We recommend that firms should incentivize the concerted efforts required for producing high-quality open data. Establishing clear policies and protocols for data privacy, integrity, and ownership is crucial to protect sensitive information and build trust among

stakeholders. This holistic, collaborative approach, as identified through our research, allows open data to realize its full transformative potential, driving innovation, shared prosperity, and a symbiotic ecosystem that benefits all stakeholders.

For practitioners, this means actively engaging in partnerships and seeking participatory feedback to ensure that the open data they produce is relevant and useful. Looking ahead, industrial firms should continue to refine their data practices and foster robust public-private collaborations to sustain and enhance the value derived from open data initiatives.

References

1. Lampikoski, T., Westerlund, M., Rajala, R., & Möller, K. (2014). Green innovation games: Value-creation strategies for corporate sustainability. *California Management Review*, 57(1), 88-116.

2. Elkington, J. (1998), *Cannibals with forks: The triple bottom line of 21st century Business*, New Society Publishers.

3. Strand, R. (2024). Global Sustainability Frontrunners: Lessons from the Nordics. *California Management Review*, *66*(3), 5-26.

4. Schneider, S. and Clauß, T. (2019), Business models for sustainability: choices and consequences, *Organization and Environment*, 33 (3), 1-24.

5. Manninen, K., Laukkanen, M., and Huiskonen, J. (2024), Framework for sustainable value creation: a synthesis of fragmented sustainable business model literature, *Management Research Review*, 47 (1), 99-122.

6. Jetzek, T., Avital, M., & Bjørn-Andersen, N. (2019). The sustainable value of open government data. *Journal of the Association for Information Systems*, 20 (6), 702-734.

7. Hossain, M. A., Dwivedi, Y. K., & Rana, N. P. (2016). State-of-the-art in open data research: Insights from existing literature and a research agenda. *Journal of organizational computing and electronic commerce*, *26*(1-2), 14-40.

8. Mohamed, M., Pillutla, S., & Tomasi, S. (2020). Extraction of knowledge from open government data: The knowledge iterative value network framework. *VINE Journal of Information and Knowledge Management Systems*, *50*(3), 495-511.

9. Berrone, P., Ricart, J. E., & Carrasco, C. (2016). The open kimono: Toward a general framework for open data initiatives in cities. *California Management Review*, *59*(1), 39-70.

10. Enders, T., Benz, C. and Satzger, G. (2021), Untangling the open data value paradox: How organizations benefit from revealing data, in *Innovation Through Information Systems: Volume III: A Collection of Latest Research on Management Issues*, 200-205, Springer International Publishing, Cham.

11. Davies, T., Walker, S., Rubinstein, M., & Perini, F. (Eds.). (2019). The State of Open Data: Histories and Horizons. African Minds.

12. Janssen, M., Charalabidis, Y., & Zuiderwijk, A. (2012). Benefits, adoption barriers and myths of open data and open government. *Information Systems Management*, 29(4), 258-268.

13. Jetzek, T. (2017). Innovation in the open data ecosystem: Exploring the role of real options thinking and multi-sided platforms for sustainable value generation through open data. *Analytics, Innovation, and Excellence-Driven Enterprise Sustainability*, 137-168.

14. Kassen, M. (2018), Adopting and managing open data: stakeholder perspectives, challenges and policy recommendations, *Aslib Journal of Information Management*, 70 (5), 518-537.

Ebba Fahlgren (Follow)

Ebba Fahlgren is doing her master's program in Industrial Engineering and Management with the specialization of Innovation and Strategic Business Development, at Luleå University of Technology, Sweden. Her research interest is in the domain of sustainability and open innovation.

Shamima Haque (Follow)

Shamima Haque is an associate professor of Techno Main Salt Lake, India. She completed her PhD from University of Calcutta, India. Her research areas are circular economy, organizational culture, sustainability, Green HR and leadership. Prior papers by her have appeared in ABDC and Scopus-listed journals.

Debadrita Panda (Follow)

Debadrita Panda is a postdoctoral scholar at entrepreneurship and innovation at Luleå University of Technology, Sweden. She currently works on the topics of circular economy and circular business models. She has published papers in ABDC enlisted journals like International Journal of Organizational Analysis, Journal of Consumer Behaviour.