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ROLES OF INDUSTRY ASSOCIATIONS IN INDUSTRIAL ECOSYSTEMS – THE CASE OF HUNGARIAN BATTERY ASSOCIATION

AZ IPARÁGI SZÖVETSÉGEK SZEREPE AZ IPARI ÖKOSZISZTÉMÁKBAN – A MAGYAR AKKUMULÁTOR SZÖVETSÉG ESETE

Industry associations play important roles in industrial ecosystems, yet their multiple functions are difficult to capture through a single theoretical perspective. This study examines the role configuration of the Hungarian Battery Association and evaluates the explanatory contributions of industrial network management, meta-organization theory, and civil society organization scholarship. Using a single-case design, the authors conducted a deductive codebook thematic analysis of HUBAs activities from its inception in 2021 to 2026. They find that all roles identified by industrial network management and meta-organization theory are evident in HUBA's activities, but their presence varies while some roles predicted by CSO literature were either absent or partially evident in HUBA's activities. The findings reveal that the same organization activity can fulfil theoretically distinct roles depending on their purpose, beneficiaries, and relational context. The study shows that combining the three perspectives provides a more comprehensive functional explanation of industry associations operating within strategic industrial ecosystems.

Keywords: **battery industry, industry associations, organizational roles, meta-organizations, industrial network management, civil society organizations**

Az iparági szövetségek fontos szerepet töltenek be az ipari ökoszisztémákban, ugyanakkor betöltött funkcióik nehezen ragadhatók meg egyetlen elméleti megközelítés segítségével. E tanulmány a Magyar Akkumulátor Szövetség (HUBA) szerepkonfigurációját vizsgálja, valamint értékeli az ipari hálózatmenedzsment, a metaorganizációs elmélet és a civil társadalmi szervezetek szakirodalmának magyarázó erejét. A szerzők kutatása egy esetre épül, amely során deduktív kódalapú tematikus elemzést végeztek a szervezet tevékenységeiről a 2021-es megalakulásától 2026-ig terjedő időszakban. Eredményeik szerint az ipari hálózatmenedzsment és a metaorganizációs elmélet által azonosított valamennyi szerep megjelenik a HUBA tevékenységében, bár eltérő mértékben, míg a civil szervezetek szakirodalmában meghatározott egyes szerepek hiányoznak, vagy csak részlegesen figyelhetők meg a HUBA működésében. Eredményeik kiemelik, hogy ugyanazon szervezeti tevékenység céljától, kedvezményezettjeitől és kapcsolati kontextusától függően eltérő elméleti szerepeket tölthet be. A tanulmány rámutat arra, hogy a három megközelítés együttes alkalmazása átfogóbb magyarázatot nyújt a stratégiai jelentőségű ipari ökoszisztémákban működő iparági szövetségek funkcióira.

Kulcsszavak: akkumulátoripar, iparági szövetségek, szervezeti szerepek, metaszervezetek, ipari hálózatmenedzsment, civil szervezetek

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The battery ecosystem is recognized by the European Union (EU) as a strategic industrial ecosystem underpinning the green transition, industrial competitiveness, and strategic autonomy (EC, 2017; EC, 2020). Like other emerging industrial ecosystems, it involves interdependent public and private actors, from raw material suppliers and manufacturers to universities, research organizations, governments, and recycling firms, whose collective capabilities are required to generate value across the entire value chain (Jacobides et al., 2018). Consequently, organizations capable of coordinating relationships across organizational boundaries have become increasingly important, as no single actor can independently coordinate the capabilities required to develop a competitive battery industry (Möller & Halinen, 1999; EC, 2019; Gieschen et al., 2021).

Recognizing the coordination challenges associated with emerging strategic industrial ecosystems, both the EU and national governments have increasingly promoted ecosystem-based governance mechanisms to mitigate fragmentation. At the EU level, initiatives such as the European Battery Alliance (EBA) were established to coordinate heterogeneous actors across the battery value chain, while national-level associations have been established to pursue similar objectives (EC, 2017; EC, 2020; Gieschen et al., 2021). For instance, Hungary's National Battery Industry Strategy, adopted in 2021, recognizes industry alliances as important coordination mechanisms and identifies the Hungarian Battery Association (HUBA) as a key coordinating organization (ITM, 2021; Patrizio et al., 2020; Wu, 2024; Czirfusz, 2023). The Strategy specifically states that HUBA should "continue coordination and dialogue between stakeholders along the entire value chain" and continuously monitor the implementation of the national action plan (ITM, 2021, p. 140).

Industry associations represent one form of intermediary organization that can address coordination challenges within industrial ecosystems. Within such ecosystems, these organizations coordinate interactions and value creation (Möller & Halinen, 1999; Aarikka-Stenroos & Halinen, 2007), while facilitating collaboration, knowledge exchange, capability development, policy coordination, and collective action across organizational boundaries (Dóra & Szalkai, 2021; Alo & Arslan, 2023; Berkowitz & Souchaud, 2024). Sustainability transition research further highlights the contribution of intermediary organizations, including meta-organizations and civil society organizations (CSOs), in mobilizing collective responses to societal challenges (Hoff et al., 2020; Berkowitz & Bor, 2024; WEF, 2023).

Despite growing recognition of the roles these organizations can play in emerging ecosystems and sustainability transitions, limited empirical research has examined how intermediary organizations combine and perform multiple roles within emerging strategic industrial ecosystems such as the battery ecosystem. Existing studies of the Hungarian battery industry have primarily focused on industrial development, foreign direct investment, electromobility, and system-level analyses of the domestic and international battery value chain in Hungary (Czirfusz, 2023; Kun, 2025; Yang, 2024). However, the roles performed by industry associations within the sector remain largely unexplored.

Beyond this empirical gap, a broader theoretical gap remains concerning how industry associations' roles can be understood. Existing research conceptualizes industry associations through several complementary but largely disconnected perspectives. Industrial network management views them as boundary-spanning intermediary organizations that facilitate coordination, resource allocation, and value creation within inter-organizational networks (Möller & Halinen, 1999; Aarikka-Stenroos & Halinen, 2007; Szalkai & Dóra, 2020). Meta-organization theory explains how organizations composed of organizational members govern collective action, represent member interests, and coordinate autonomous actors (Ahrne & Brunsson, 2008; Berkowitz et al., 2022). Civil society organization scholarship highlights the broader societal and public-value roles that non-state, non-profit organizations may perform, including advocacy, representation, capacity building, and standard setting (WEF, 2023; Hoff et al., 2020). Although these perspectives identify overlapping organizational roles, they differ in their assumptions regarding organizational purpose, governance, and behaviour. To date, few empirical studies have examined how these perspectives can be integrated to explain the role configurations of industry associations operating within strategic industrial ecosystems.

HUBA represents an especially relevant case because it exhibits characteristics associated with all three perspectives. Structurally, it exhibits characteristics of a meta-organization because its members are organizations rather than individuals. Legally, it is registered as a civil society organization under Hungarian law. Functionally, it operates as an intermediary organization embedded within both the Hungarian and wider European battery ecosystems. Rather than privileging a single theoretical perspective, this study adopts a multi-theoretical analytical framework to examine how industry associations enact multiple roles within emerging strategic industrial ecosystems using HUBA as a case study. Specifically, the study addresses the following research questions:

RQ1: What role configuration does the Hungarian Battery Association exhibit within Hungary's battery ecosystem?

RQ2: To what extent do industrial network management, meta-organization theory, and civil society organization scholarship explain the observed role configuration of the Hungarian Battery Association?

By examining HUBA through the complementary lenses of industrial network management, meta-organization theory, and civil society organization scholarship, this study contributes to literature in two ways. Empirically, it provides a systematic analysis of the role configuration of an industry association within an emerging strategic battery ecosystem. Theoretically, it demonstrates how integrating these three perspectives provides a more comprehensive understanding of intermediary organizations than any single perspective alone.

The remainder of the article is structured as follows. The next section discusses the theoretical underpinnings of the study, followed by the research design and analytical methods used to empirically examine HUBA's roles and activities. The key findings are then presented, before the article concludes with recommendations.

Theoretical perspectives on industry association roles

Over time, scholars have used a range of terms – including industry associations, alliances, networks, federations, umbrella organizations, consortia, unions, and meta-organizations – to describe organizations that facilitate collective action among firms and other organizations (Grandori, 1997; Barringer & Harrison, 2000; Reveley & Ville, 2010; Berkowitz, 2026). Although these labels are sometimes used interchangeably, Ahrne and Brunsson (2008) note that they are often applied without clearly distinguishing their theoretical foundations although terminologies may reflect different structural characteristics, governance arrangements, and organizational purposes. Consequently, similar coordinating organizations may be conceptualized differently depending on whether emphasis is placed on membership structure, governance mechanisms, network position, legal status, or broader societal functions.

This conceptual diversity is particularly evident in the study of industry associations. Although industry associations are increasingly recognized as important actors within strategic industrial ecosystems, they have been conceptualized through different theoretical perspectives. For instance, industry associations have been conceptualized as intermediary organizations embedded within industrial networks, as meta-organizations, and as civil society organizations. Each perspective captures different dimensions of industry associations and, consequently, highlights different organizational roles.

Industrial Network Management Perspective

Industrial network management is concerned with how organizations manage their relationships, activities and positions within networks of interdependent actors (Håkansson & Ford, 2002; Möller & Halinen, 1999). From this perspective, industrial networks consist of configurations of actors, resources and activities, where actors involved need not be limited to firms but may also include governmental agencies, universities, research institutions and other noncommercial organizations or individuals (Möller & Halinen, 1999).

Since the late 1980s, researchers in various fields have sought to understand organizations' abilities to manage relationships and operate within networks of organizations linked through economic and other forms of exchange (Knight & Harland, 2005; Hoványi, 2008; Baksa & Drótos, 2021). Snow et al. (1992) emphasized responsibilities related to network design, coordination and the maintenance of long-term collaborative relationships. Knight and Harland (2005) subsequently extended this perspective by highlighting the importance of coordination, information brokerage, innovation facilitation and strategic guidance within supply networks. Similarly, Järvensivu and Möller (2009) examined how network actors frame collaboration, mobilize stakeholders, activate participation and synthesize diverse interests to facilitate collective action.

Although these studies emerged from different streams of network research, they share a common concern with understanding how organizations facilitate interaction and

Table 1

Industrial network management roles and their typical manifestations in industry associations

Network management role	Definition	Typical manifestations
Motivating	Encouraging network participants to engage actively in collaborative activities and remain committed to shared objectives.	Encouraging participation; stimulating member engagement; building commitment; promoting collaborative behaviour.
Resourcing	Identifying, acquiring and mobilizing the financial, human, technological and informational resources required for network activities.	Resource mobilization; acquiring funding; mobilizing expertise; facilitating access to resources; mobilizing complementary capabilities.
Goal setting and refining	Establishing and continuously refining the shared objectives, priorities and strategic direction of the network.	Defining common goals; strategic planning; developing shared visions; refining network priorities.
Consolidating	Strengthening relationships and maintaining long-term stability and cohesion of the network.	Building trust; integrating stakeholder interests; strengthening partnerships; maintaining cooperation; resolving conflicts.
Coordinating	Organizing and aligning activities of multiple autonomous organizations to facilitate collective action.	Organizing interactions; facilitating communication; coordinating joint activities; linking network actors.
Controlling	Monitoring network activities and ensuring that agreed rules, responsibilities and governance arrangements are followed.	Monitoring progress; establishing rules; evaluating performance; ensuring accountability and compliance.
Leveraging	Using and combining the knowledge, relationships and capabilities created within the network to generate additional value.	Applying shared knowledge; combining capabilities; disseminating learning; exploiting network relationships; facilitating innovation.

Source: adapted from Aarikka-Stenroos et al. (2017)

collaboration among multiple autonomous actors. This differs from social network research, which is primarily concerned with the structure of relationships among actors, patterns of interaction and actors' positions within networks (Borgatti & Foster, 2003; Borgatti et al., 2009; Csonka, 2011; Mandják & Szántó, 2011; Vicsek et al., 2016).

Building on these different streams of network research, Aarikka-Stenroos et al. (2017) synthesized insights from strategic network literature, innovation network studies and industrial marketing and purchasing research into a comprehensive framework of network-management activities. The resulting framework identifies seven interrelated network-management activities: motivating, resourcing, goal setting and refining, consolidating, coordinating, controlling, and leveraging (Table 1).

This framework is particularly relevant to emerging strategic industrial ecosystems such as the battery ecosystem because these contexts involve heterogeneous actors including manufacturers, suppliers, research organizations, universities, public authorities, investors, regulators and industry associations. As Aarikka-Stenroos et al. (2017) argue, increasing actor diversity expands the resources available for innovation while making coordination substantially more challenging. Under such conditions, intermediary organizations can support collective action by mobilizing participants, integrating complementary capabilities, facilitating collaboration and maintaining relationships across organizational boundaries (Aarikka-Stenroos & Halinen, 2007).

Meta-organization perspective

While industrial network management explains how organizations coordinate relationships within inter-organizational networks, meta-organization theory provides a complementary perspective by focusing on organizations whose members are organizations (Ahrne & Brunsson, 2008; Berkowitz et al., 2022). From this perspective, meta-organization is an analytical category rather than a formal designation. Consequently, entities described as industry associations, alliances, consortia or networks may be considered meta-organizations insofar as their members are organizations (Berkowitz, 2026).

Unlike conventional organizations, meta-organizations coordinate legally autonomous organizations that retain their own identities, decision-making authority and objectives. As a result, coordination relies more heavily on negotiation, collective decision-making and the alignment of member interests (Ahrne et al., 2016; Berkowitz & Grothe-Hammer, 2022). Meta-organizations operate across diverse sectors (Ahrne & Brunsson, 2008) and geographical scales (Berkowitz et al., 2022), industry associations represent one of the most prevalent forms of meta-organizations (Berkowitz, 2026).

While early research primarily emphasized the structural characteristics of meta-organizations, more recent scholarship has increasingly focused on their activities. Building on Ahrne and Brunsson (2008), Berkowitz et al. (2022) identify four broad meta-organizational activities: governance and co-management, advocacy, boundary and category work, and service provision (Table 2).

Governance and co-management involve coordinating autonomous member organizations through collectively established decision-making arrangements. Because member organizations retain their identities and autonomy, meta-organizational governance relies on joint decisions, agreed rules and other collectively established mechanisms rather than conventional hierarchical authority (Ahrne et al., 2016; Berkowitz et al., 2022).

Advocacy involves representing members' collective interests, influencing regulatory environments, participating in policy processes and acting as the collective voice of an industry (Berkowitz et al., 2022). *Boundary and category work* includes defining membership boundaries, constructing collective identities and categories, and contributing to the legitimacy and institutional development of industries (Ahrne & Brunsson, 2008; Ahrne et al., 2016; Berkowitz et al., 2022), while *service provision* covers activities aimed at strengthening members' capabilities, including knowledge sharing, research, training and other support activities (Berkowitz et al., 2022).

Meta-organizations may pursue multiple objectives simultaneously; therefore, the activities they perform are neither discrete nor mutually exclusive (Ahrne & Brunsson, 2008; Dumez & Renou, 2020). Recent research

Table 2

Meta-organization roles and their typical manifestations in industry associations

Meta-organizational role	Definition	Typical manifestations
Governance and co-management	Facilitating interaction, collective decision-making and the joint management of relationships among autonomous member organizations	Membership rules; governing bodies; committees and working groups; collective decision-making; coordination of joint initiatives.
Advocacy	Representing and advancing the collective interests of members in relation to governments and external stakeholders.	Lobbying; position papers; stakeholder representation; policy dialogue; public communication
Boundary and category work	Establishing organizational and field boundaries and constructing the identity, categories, status and legitimacy of a collective or industry.	Membership boundaries; sector classification; industry identity; category construction; legitimacy building; field definition.
Service provision	Strengthening members' capabilities through the provision of services, information and shared resources.	Knowledge sharing; research; training; capacity building; resource mobilization; resource allocation.

Source: adapted from Ahrne and Brunsson (2008) and Berkowitz et al. (2022)

suggests that the extent to which meta-organizations are able to perform their governance and co-management, advocacy, boundary and category work, and service provision roles depends on the resources available to them (Bor & Cropper, 2023). The roles of meta-organizations have become increasingly relevant within sustainability transitions and emerging industrial ecosystems, where complex system-level challenges require collaboration among heterogeneous organizations and the combination of complementary capabilities and resources (Valente & Oliver, 2018; Berkowitz et al., 2022; Berkowitz & Bor, 2024; Berkowitz & Souchaud, 2024).

Civil society organization perspective

Although civil society organizations (CSOs) are commonly equated with non-governmental organizations (NGOs), they encompass a broader range of voluntary and associational organizations, including professional and business associations, trade unions, coalitions, umbrella organizations, academic and research institutions, and network organizations (Edwards, 2011; Guénéheux & Bottomley, 2014; Salamon et al., 2017; UIA, 2023; WEF, 2013; 2023). Civil society scholarship examines these diverse forms of voluntary collective action and their broader societal roles (Edwards, 2011; Hoff et al., 2020).

The World Economic Forum identifies ten distinct, but interconnected roles (Table 3) performed by civil society actors: service provider, advocate, watchdog, expert, capacity builder, incubator, representative, citizenship champion, solidarity supporter, and definer of standards (WEF, 2013).

The CSO roles should not be viewed as mutually exclusive, as contemporary civil society actors may perform overlapping functions, often in collaboration with business, government and other stakeholders (WEF, 2013). Given HUBA's legal status as a civil association, the CSO perspective is applied as a functional lens to examine the extent to which these broader societal roles are evident in its activities.

Table 3

CSO roles and their typical manifestations

CSO role	Definition	Typical manifestations
Service provider	Delivering services that address societal needs and complement public and private sector activities.	Provision of societal services; project implementation; technical assistance; community support.
Advocate	Raising awareness of societal issues and advocating for policy or institutional change.	Public-interest advocacy; policy engagement; public campaigns; position papers addressing societal issues.
Watchdog	Holding institutions to account and promoting transparency and accountability.	Independent monitoring; public reporting; scrutiny; accountability initiatives.
Expert	Generating, disseminating and applying knowledge to inform policy and practice.	Research; knowledge sharing; expert advice; evidence generation.
Capacity builder	Strengthening the capabilities of organizations, communities and stakeholders.	Training; education; workshops; mentoring; technical support.
Incubator	Developing and supporting solutions that require relatively long development or payback periods.	Development and testing of long-term solutions; pilot initiatives; experimentation; support for emerging solutions.
Representative	Giving voice and influence to marginalized or under-represented groups.	Representation of marginalized constituencies; inclusive consultation; amplifying under-represented voices.
Citizenship champion	Promoting civic participation, inclusion and democratic engagement.	Citizen participation; civic engagement; rights awareness; public dialogue.
Solidarity supporter	Promoting fundamental and universal values.	Promotion of shared societal values; values-based campaigns; social solidarity; coalition building around societal principles.
Definer of standards	Contributing to the development and promotion of ethical, professional or industry standards.	Standards development; codes of conduct; best-practice guidelines; development of professional or industry norms.

Source: adapted from WEF (2013)

A multi-theoretical analytical framework for analysing industry association roles

The preceding sections indicate that industrial network management, meta-organization theory, and civil society organization scholarship provide distinct but complementary perspectives on the role of industry associations and their activities. Table 4 synthesizes the three perspectives by identifying areas of conceptual correspondence and divergence together with the illustrative manifestations of each role.

As indicated in Table 4, one area of conceptual correspondence relates to advocacy. Within the meta-organization perspective, advocacy refers to the representation of members' collective interests in relation to governments, regulators and other external stakeholders (Berkowitz et al., 2022), whereas civil society advocacy concerns broader societal issues and policy or institutional change (WEF, 2013). Thus, similar activities may appear across perspectives while differing in their purpose, intended beneficiaries and relational context.

A similar distinction is evident in knowledge-related activities. The CSO *expert* role emphasizes the generation and application of expertise, network *leveraging* concerns

Table 4

Multi-theoretical analytical framework for analysing industry association roles

CSO role	Network management role	Meta-organizational role	Illustrative indicators
Solidarity supporter	Consolidating*	Governance and co-management*	Shared values; relationship building; collective participation
–	Coordinating	Governance and co-management	Interaction; communication; joint activities; collective decision-making
–	Motivating	–	Participation; engagement; commitment
Watchdog	Controlling*	–	Independent monitoring; accountability; compliance monitoring
Definer of standards	Goal setting and refining*	Boundary and category work*	Standards; strategic priorities; classifications; industry boundaries
Representative	–	Advocacy*	Under-represented voices; collective member representation
Advocate	–	Advocacy*	Policy change; lobbying; policy dialogue; member-interest representation
Expert	Leveraging*	Service provision*	Research; expert knowledge; knowledge sharing; information services
Capacity builder	–	Service provision*	Training; education; capability development; technical support
Service provider	Resourcing*	Service provision*	Societal services; resource mobilization; shared member services
Citizenship champion	–	–	Citizen participation; civic engagement; rights awareness
Incubator	–	–	Long-term solutions; experimentation; solution development

*Note: * indicates partial conceptual correspondence. Roles appearing in the same row are not treated as theoretically equivalent. The original role definitions and manifestations presented in Tables 1–3 guided classification, with the purpose, intended beneficiaries and relational context of each activity considered when distinguishing theoretically similar roles.*

Source: authors' synthesis based on Aarikka-Stenroos et al. (2017), Ahrne and Brunsson (2008), Berkowitz et al. (2022), and WEF (2013, 2023)

facilitating access to and utilization of knowledge and other resources, while meta-organizational *service provision* captures the provision of knowledge-based services to members (Aarikka-Stenroos et al., 2017; Berkowitz et al., 2022; WEF, 2013). Thus, knowledge-related activities may correspond to all three perspectives, but for different theoretical reasons. At the same time, roles such as *citizenship champion* are unique to the CSO perspective and would not be captured by focusing solely on the network-management or meta-organization perspective.

In view of the above, this study adopts a multi-theoretical analytical framework for investigating the role configuration of HUBA. Rather than integrating overlapping roles into a new taxonomy, the framework preserves the theoretical meaning of the roles within each perspective. The roles summarized in Table 4 constitute the analytical framework and provide the deductive basis for coding the empirical evidence, while the conceptual distinctions guide the interpretation of activities that potentially correspond to roles across more than one perspective.

Methodology and Research Design

This study adopts a qualitative single-case study design to investigate the role configuration of the Hungarian Battery Association within the emerging Hungarian battery ecosystem. This design is appropriate because the case study approach enables an in-depth investigation of a contemporary phenomenon within its real-life context (Yin, 2018).

HUBA as the case organization

The Hungarian Battery Association was established in July 2021, the same year when Hungary adopted its National Battery Industry Strategy as a representative body for companies operating in the battery industry value chain (HUBA, 2023). As of July 2026, HUBA had 108 registered members (HUBA, 2026). Its membership comprises actors across the Hungarian battery value chain, including industrial firms (SMEs and local subsidiaries of multinational corporations), research and innovation organizations, and educational institutions.

HUBA is also a member of international networks including the European Battery Alliance and Eit InnoEnergy (HUBA, 2022, 2025). HUBA therefore provides an appropriate case for examining how an industry association performs multiple organizational roles within an emerging strategic industrial ecosystem characterized by heterogeneous actors.

Data sources and collection

To enhance the credibility and contextual richness of the analysis, the study draws on multiple complementary sources of evidence. The primary dataset comprised documentary evidence of HUBA's activities, while semi-structured interviews and participant observations were used

as supplementary sources for contextualization and triangulation.

Documentary evidence

The primary empirical dataset comprised 148 documentary records relating to HUBA's activities between its establishment in July 2021 and July 2026. These included HUBA's Articles of Association, official website publications, LinkedIn posts, reports, news items, policy documents and other publicly available organizational communications. These sources were selected because they provide a systematic and publicly verifiable record of the Association's activities. In addition, 62 emails distributed to all HUBA members between 10 October 2023 and 9 July 2024 were included; correspondence addressed only to individual members was excluded.

Semi-structured interviews and direct participant observation

Supplementary evidence was obtained through two semi-structured interviews, one with HUBA's CEO and another with the CEO of a HUBA member organization. The interviews were used to clarify organizational processes and contextualize and triangulate interpretations derived from the documentary analysis.

Participant observation was also conducted at five major battery-industry events organized or attended by HUBA between 2023 and 2025 (Table 5). These observations provided additional contextual evidence on stakeholder interactions, networking activities and knowledge-sharing processes within the Hungarian battery ecosystem.

Table 5

Events attended for participant observation

Event	Year	Appr. Number of participants
Hungarian Battery Day (Budapest, Hungary)	2023, 2024, 2025	500
Environmental Protection and Industrial Safety Conference (Visegrád, Hungary)	2024	200
Korea-Hungary Battery Industry Cooperation Forum (Budapest, Hungary)	2024	200

Source: authors' construct

Unit of analysis and analytical procedure

The study employed a theory-driven (deductive) codebook thematic analysis, which provides a structured framework suitable for applied and collaborative research (Braun & Clarke, 2021). Discrete organizational activities performed by HUBA constituted the units of coding and were analysed using the original role categories proposed by Aarikka-Stenroos et al. (2017), Berkowitz et al. (2022), and WEF (2013), as synthesized in Table 4. Analysis of the 148 documents identified 58 distinct organizational activities performed by HUBA. Since an activity could fulfil multiple purposes simultaneously, the same activity could be assigned to more than one role and interpreted across more than one theoretical perspective where supported by the original theoretical definitions.

Two co-authors initially analysed the documentary corpus using NVivo, while Microsoft Excel was used to organize the results. An additional co-author conducted a comparable analysis as a further validation step. This collaborative process facilitated comparison and interpretive convergence among researchers (Saldaña, 2013). Differences in interpretation were discussed among the co-authors and resolved by referring to the original theoretical definitions and the organizational purpose of the activity.

Although the analysis remained qualitative, descriptive frequency counts were calculated following the deductive coding process to indicate the relative prevalence of theoretically derived roles across the 58 organizational activities (Neuendorf, 2017). These frequencies were used to compare the prominence of roles within and across the three theoretical perspectives rather than for statistical inference. The key findings of the analyses are discussed next.

Findings and discussions on the role configuration of Hungarian Battery Association

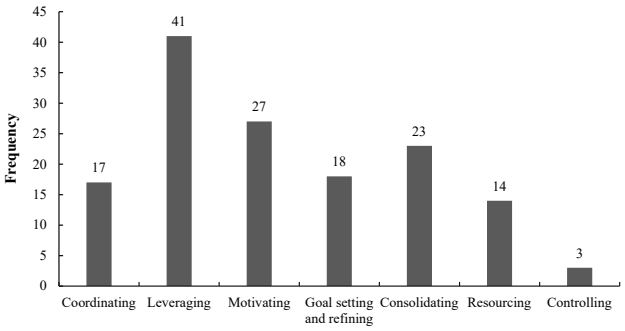
This section presents the findings in two parts, corresponding to the study's research questions. The first identifies HUBA's organizational role configuration, while the second evaluates the extent to which industrial network management, meta-organization theory and civil society organization scholarship explain the observed configuration.

HUBA's role configuration from the industrial network management perspective

From the industrial network management perspective, we find that all seven network-management activities were evident in HUBA's role configuration, although their relative prevalence varied considerably. As shown in Figure 1, *leveraging* was the most frequently identified activity (41 occurrences), followed by *motivating* (27) and *consolidating* (23), whereas *controlling* was identified only three times.

Figure 1

Industrial network management role profile of HUBA



Source: authors' analysis

The observed configuration indicates that HUBA's network-management activities are oriented primarily towards leveraging resources and knowledge, encouraging actor participation in ecosystem activities, and strengthening relationships, while controlling was not prominent during the study period. Table 6 summarizes the empirical evidence for each network-management role and representative organizational activities.

Table 6

Observed network management roles performed by HUBA

Network management role	Main empirical evidence	Representative organizational activities
Coordinating	Articles of Association; member emails; LinkedIn posts; conferences; participant observation	Working groups; Hungarian Battery Week; professional conferences; stakeholder forums; international cooperation
Leveraging	Emails; LinkedIn posts; Competence Map; publications; workshops	Knowledge sharing; competence mapping; technical presentations; newsletters; study visits
Motivating	Member emails; LinkedIn posts; invitations to events and consultations	Encouraging participation in consultations, workshops, conferences and working groups
Goal setting and refining	Articles of Association; AFIR position paper; regulatory consultations	Battery Strategy 2030; AFIR recommendations; regulatory input; industry roadmaps
Consolidating	Conferences; MoUs; international partnerships; working groups	Bringing together firms, universities, government bodies and international partners
Resourcing	Articles of Association; EIPP; laboratory; MoUs; funding calls	Grants; flagship projects; research infrastructure; laboratory equipment; project opportunities
Controlling	Articles of Association; membership framework; regulatory communication	Membership criteria; compliance communication; environmental responsibility

Source: authors' synthesis

The dominant role, *leveraging*, was evident in HUBA's conferences, newsletters, technical guidance, digital knowledge platforms and exchanges among industrial, academic and governmental actors. Its knowledge-related dimension was also reflected in an interview with the CEO of a member organization, who explained that *"One of the important tasks of the Association is to educate its own members about the regulations, technological developments and opportunities affecting the battery industry."*

The *motivating* and *coordinating* roles were observed through HUBA's repeated invitations to consultations, workshops and events. For example, in relation to consultations by the European Union Agency for the Cooperation of Energy Regulators (ACER), members were invited by email to contribute individually or through HUBA's collective response.

Goal setting and refining, consolidating, and *resourcing* were also evident in activities related to Battery Strategy 2030, Hungarian Battery Week, thematic working groups, the European Industrial Partnership Programme, the Korea-Hungary Battery Cooperation Center and the Battery Laboratory Equipment Park (Table 6).

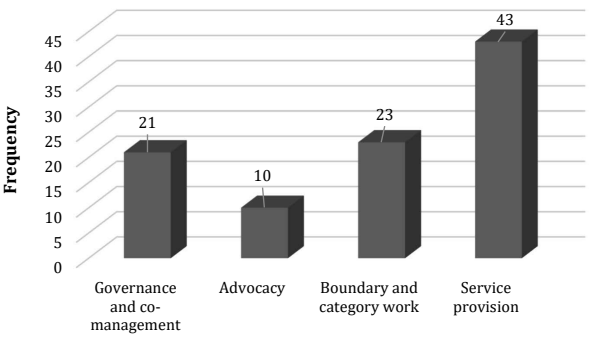
HUBA's observed activities closely correspond to the network-management framework of Aarikka-Stenroos et al. (2017). Although all seven activities were identified, the predominance of leveraging, motivating and consolidating indicates that the Association contributes primarily by mobilizing knowledge and other network resources, encouraging participation and strengthening collaborative relationships rather than through controlling activities. This pattern is consistent with network-management research emphasizing the importance of mobilizing resources and actors, stimulating collaboration, and building trust and cohesion among heterogeneous network participants (Möller & Halinen, 1999; Aarikka-Stenroos et al., 2017). It also aligns with research on intermediary actors showing that third actors can facilitate connections between otherwise separate organizations and enable access to resources that support inter-organizational collaboration (Aarikka-Stenroos & Halinen, 2007; Dóra & Szalkai, 2021). In addition, findings are consistent with Bengtsson and Kock (2000) who show that associations can play an intermediary role in managing relationships among firms that simultaneously cooperate and compete.

HUBA's role configuration from the meta-organization perspective

From the meta-organization perspective, our analysis indicates that all four expected roles were evident in HUBA's activities, although their relative prevalence varied. As shown in Figure 2, service provision was the most frequently identified role (43 occurrences), followed by boundary and category work (23) and governance and co-management (21), while advocacy was less frequent (10).

Figure 2

Meta-organizational role profile of HUBA



Source: authors' analysis

The frequency distribution (Figure 2) indicates that HUBA's meta-organizational activities are oriented primarily towards providing collective services, defining and strengthening the emerging industry, and coordinating relations among autonomous member organizations. Table 7 summarizes the empirical evidence for each meta-organizational role.

autonomous member organizations. Its Articles of Association establish governing bodies and collectively agreed rules, while thematic working groups, stakeholder forums and collaborative initiatives provide mechanisms through which members participate in and coordinate collective activities. These arrangements are consistent with the meta-organizational form in which autonomous

Table 7

Observed meta-organizational roles performed by HUBA

Meta-organizational role	Main empirical evidence	Representative organizational activities
Governance and co-management	Articles of Association; working groups; quarterly reports; member meetings	Coordinating autonomous members; facilitating working groups; convening the General Assembly; organizing stakeholder forums
Advocacy	AFIR position paper; ACER consultation; regulatory consultations; interviews	Consolidating member views; policy dialogue; legislative consultation; representing members before authorities
Boundary and category work	Articles of Association; membership criteria; Competence Map; Battery Strategy 2030; media interviews	Defining organizational membership; mapping the battery ecosystem; promoting ecosystem legitimacy; strategic ecosystem development; public communication
Service provision	Emails; workshops; LinkedIn posts; Competence Map; Home Energy Storage Platform; professional book	Providing newsletters and technical information; training; conferences; comparison tools; knowledge services

Source: authors' synthesis

Service provision was evident in HUBA's conferences, workshops, newsletters, technical publications, competence-development activities, study visits and digital platforms such as the Home Energy Storage Platform. These activities provided members with information, knowledge-sharing opportunities and other collective resources, consistent with Berkowitz et al.'s (2022) conceptualization of service provision as encompassing information production, research, training, knowledge sharing, capacity building and the provision of joint resources to members.

Boundary and category work was evident in HUBA's efforts to define the boundaries, identity and legitimacy of the emerging Hungarian battery ecosystem. Membership criteria contributed to defining which organizations could belong to the Association, while the Competence Map identified and categorized actors and capabilities within the battery ecosystem. HUBA's involvement in Battery Industry Strategy 2030 and its public communication further contributed to shaping the sector's strategic direction and collective identity. Media interviews addressing public concerns surrounding battery production, including the Samsung SDI case in Göd, also illustrate HUBA's engagement in strengthening the legitimacy and collective reputation of the sector. These activities are consistent with the boundary and category work of meta-organizations (Berkowitz et al., 2022), while the prominence of membership criteria also reflects the central importance of membership boundaries in meta-organizational forms (Ahrne et al., 2016).

Governance and co-management were evident in HUBA's formal decision-making arrangements and mechanisms for coordinating collective action among member organizations retain their organizational identities while participating in joint decision-making and collectively established governance arrangements (Ahrne et al., 2016).

Advocacy was evident in HUBA's representation of members' collective interests in national and European policy consultations. For example, in its response concerning the Alternative Fuels Infrastructure Regulation (AFIR), HUBA's position paper stated that it *"responds to the provisions of the Decree on the Development of Alternative Fuels Infrastructure... the opinions of other HU-BA members are also displayed."* This illustrates the meta-organizational character of HUBA's advocacy, whereby member positions were consolidated and represented collectively in the regulatory process consistent with the collective-interest representation associated with industry meta-organizations (Berkowitz et al., 2022).

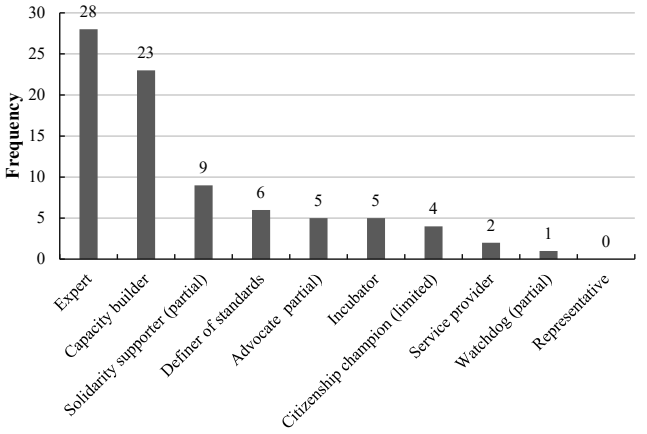
The findings therefore support the characterization of HUBA as meta-organizations that simultaneously facilitate interaction among members, undertake collective action towards their environment, construct collective identities and undertake common tasks on behalf of their members (Ahrne & Brunsson, 2008; Berkowitz et al., 2022).

HUBA's role configuration from the civil society organization perspective

From the civil society organization perspective, we find that HUBA exhibited a selective role configuration (Figure 3). Expert (28 occurrences) and capacity builder (23) were the most frequently identified roles, while representative was not identified and watchdog and citizenship champion were only weakly evident.

Figure 3

Civil society role profile of HUBA



Note: "Partial" or "limited" means there is some correspondence, but the activity does not fully satisfy WEF's definition.
Source: authors' analysis

The role frequency distribution indicates that HUBA's most prominent CSO-type activities concern the provision of expertise and development of capabilities, whereas roles more directly associated with public accountability, citizen engagement and representation of under-represented groups are considerably less prominent (Table 8).

The *expert* role was the most prominent CSO function identified. It was reflected in HUBA's technical publications, professional conferences, regulatory and technological workshops, research-related activities and dissemination of specialist knowledge. The *capacity builder* role was similarly prominent and was evident in Battery Industry Basics lectures, workshops, study visits, laboratory facilities and other educational and knowledge-sharing activities aimed at strengthening the capabilities of members and other battery-ecosystem participants. These findings closely correspond to the WEF (2013) conception of CSOs as experts that contribute knowledge and experience to policy, strategy and solution development and as capacity builders providing education, training and capability development.

The *solidarity supporter* role was less prominent. Relevant activities included environmental protection and industrial safety initiatives, communication on responsible battery production and activities concerning recycling and circularity. Similarly, the *definer of standards* role was evident where HUBA contributed to the development or shaping of regulatory, technical and professional norms affecting the battery sector. Examples include HUBA's participation in consultations concerning alternative-fuels infrastructure, PFAS restrictions, battery carbon-footprint requirements and fire-safety rules.

The a*dvocate* role provides one of the clearest distinctions between the civil society and meta-organizational perspectives. Although HUBA actively participated in policy consultations and regulatory dialogue, these activities primarily represented the collective interests of member organizations and the battery sector and therefore corresponds more closely to meta-organizational advocacy

Table 8

Observed civil society organization roles performed by HUBA

CSO role	Main empirical evidence	Interpretation
Expert	Technical publications; conferences; Battery Week; professional book; regulatory and technical workshops	HUBA produces and disseminates specialist knowledge and expertise
Capacity builder	Workshops; Battery Industry Basics lectures; study visits; laboratory facilities; training and knowledge platforms	HUBA develops capabilities among members and other ecosystem participants
Solidarity supporter	Sustainability-related events; environmental protection and safety activities; recycling and circularity initiatives	HUBA partially promotes broader values related to sustainability, safety and environmental responsibility
Definer of standards	Regulatory consultations; AFIR; PFAS; carbon-footprint and fire-safety discussions; professional benchmarks	HUBA contributes to shaping regulatory, technical and professional norms
Advocate	Regulatory consultations; environmental and sustainability communication	Advocacy occasionally addresses broader societal or environmental concerns but remains predominantly sector-oriented
Incubator	EIPP; Korea–Hungary Battery Cooperation Center; Battery Laboratory Equipment Park; research and circularity initiatives	HUBA supports the development of longer-term technological and innovation solutions
Citizenship champion	Home Energy Storage activities; public energy-storage and environmental communication	Citizen-facing engagement is present but limited
Service provider	Home Energy Storage Program; household comparison platform	Some services address societal or household needs beyond HUBA's membership
Watchdog	Environmental and sustainability-related public communication	Limited evidence of independent accountability or oversight
Representative	No clear qualifying activity identified	No evidence of systematic representation of marginalized or under-represented groups

Source: authors' synthesis

than CSO-type advocacy which focuses on broader societal or environmental concerns (WEF, 2013). This distinction illustrates how apparently similar activities may fulfil different organizational roles depending on their purpose and intended beneficiaries.

The *incubator* role was evident in a smaller number of activities supporting longer-term technological and innovation development, including the European Industrial Partnership Programme, Korea–Hungary Battery Cooperation Center, Battery Laboratory Equipment Park, and research and circularity initiatives. These activities correspond to the WEF (2013) conception of incubation as developing solutions that may require relatively long gestation or payback periods.

The remaining CSO roles were only weakly evident. Limited *service provider* activity was identified where HUBA's activities addressed needs extending beyond its membership, particularly through the Home Energy Storage Program and household-oriented comparison platform. Similarly, *citizenship champion* activities were limited to a small number of citizen-facing initiatives and public communications concerning energy storage, sustainability and environmental issues, with little evidence of systematic citizen participation, empowerment or rights-oriented engagement.

The *watchdog* role was particularly weak. Although HUBA communicated on environmental regulation, sustainability and responsible battery production, little evidence was identified as independent monitoring, scrutiny or public accountability directed towards the battery industry or its members. There was also no clear evidence of the *representative* role as defined by WEF (2013), which concerns giving voice to marginalized or under-represented groups.

The findings indicate that HUBA's correspondence with the CSO framework is concentrated primarily in the *expert* and *capacity builder* roles, while roles associated with independent public accountability, citizen engagement and representation of marginalized or under-represented groups are weak or absent. Although HUBA is legally registered as a civil association in Hungary (HUBA, 2025), its observed CSO-type activities are predominantly oriented towards supporting members and the battery ecosystem, with more limited evidence of functions directed towards wider societal constituencies. This differentiated role configuration is consistent with the view that contemporary CSOs may perform multiple and overlapping roles, with their particular configuration varying according to organizational purpose and context (WEF, 2013; 2023).

Explanatory contribution of industrial network management, meta-organization, and CSO perspectives to HUBA's role configuration

The preceding sections demonstrate that HUBA performs roles identified within industrial network management, meta-organization theory and civil society organization scholarship, although the explanatory reach of the three perspectives varies. A further finding is that many of the 58 identified organizational activities correspond to multiple roles across the theoretical perspectives. These overlaps do not indicate conceptual inconsistency; rather, the same activity may acquire different theoretical significance depending on its purpose, beneficiaries and relational context. Table 9 illustrates this cross-theoretical correspondence using selected HUBA activities.

Table 9

Cross-theoretical interpretation of selected activities performed by HUBA

Organizational activity	Network management interpretation	Meta-organization interpretation	CSO interpretation
AFIR consultation	Goal setting and refining	Advocacy	Advocate (partial); definer of standards
Hungarian Battery Week / Battery Day	Coordinating; consolidating; leveraging; motivating	Governance and co-management; service provision; boundary and category work	Expert; capacity builder; solidarity supporter (partial)
HUBA Competence Map	Leveraging; coordinating	Boundary and category work; service provision	Expert; capacity builder
Home Energy Storage comparison platform	Leveraging; resourcing	Service provision	Expert; capacity builder; service provider; citizenship champion (limited)
EIPP / Korea–Hungary Battery Cooperation Center	Resourcing; leveraging; consolidating	Service provision; governance and co-management	Incubator; capacity builder; expert
Battery Laboratory Equipment Park	Resourcing; leveraging	Service provision	Expert; incubator; capacity builder

Source: authors' synthesis

The three perspectives direct attention to different dimensions of the same organizational activities. At the same time, apparently similar roles across the perspectives are not necessarily conceptually equivalent. This is particularly evident in *advocacy* and *service provision*. HUBA's participation in regulatory consultations illustrates this distinction. From the meta-organization perspective, such activities constitute *advocacy* because the Association consolidates and represents the collective interests of its members. However, the same activity corresponds only partially to CSO advocacy because its primary purpose is the representation of member and sectoral interests rather

than advocacy concerning broader societal issues. The AFIR consultation also constitutes *goal setting and refining* from the industrial network management perspective because it contributes to shaping the regulatory environment affecting the network, and *definer of standards* from the CSO perspective through its contribution to regulatory development.

Similarly, Hungarian Battery Week and related professional events facilitate coordination, relationship building and knowledge exchange from the network-management perspective; provide collective services and mechanisms for member interaction from the meta-organization perspective; and perform primarily *expert* and *capacity builder* functions from the CSO perspective. While these activities constitute meta-organizational *service provision* because their principal beneficiaries are members and ecosystem participants, they do not necessarily correspond to the CSO *service provider* role, which requires a clearer orientation towards addressing societal needs. The purpose and intended beneficiaries of an activity are therefore important for distinguishing theoretically similar roles.

The HUBA Competence Map provides another illustration. By mapping organizations and capabilities across the Hungarian battery value chain, it facilitates *leveraging* and *coordination* among network actors. From the meta-organization perspective, it constitutes *service provision* and *boundary and category work* by providing a collective resource while identifying and categorizing actors within the battery ecosystem. From the CSO perspective, it primarily performs *expert* and *capacity builder* roles through the production of specialized knowledge and facilitation of access to complementary capabilities.

Our findings indicate that the three perspectives explain different but complementary dimensions of HUBA's role configuration. All roles identified by the industrial network management and meta-organization frameworks were evident in HUBA's activities, although their prevalence varied. In contrast, correspondence with the CSO framework was more selective, with some roles strongly evident and others weak or absent. The three perspectives therefore differ in their explanatory reach. Industrial network management captures HUBA's coordination of relationships and resources across the battery ecosystem, meta-organization theory captures its organization of collective member action, while the CSO perspective identifies the extent to which its activities extend towards broader societal functions. No single perspective fully explains HUBA's role configuration; the combined application of the three frameworks provides a more comprehensive understanding of the roles performed by industry associations in strategic industrial ecosystems.

Conclusions and limitations

This study examined two research questions: what role configuration does the Hungarian Battery Association (HUBA) exhibit within Hungary's emerging battery ecosystem, and to what extent do industrial network management, meta-organization theory and civil society organization scholarship explain this configuration? To address these questions, the study adopted a qualitative single-case design and deductive thematic analysis of documentary evidence, complemented by interviews and participant observation for contextualization and triangulation.

Regarding the first research question, the findings reveal a multidimensional role configuration. All roles identified by the industrial network management and meta-organization frameworks were evident in HUBA's activities, although their prevalence varied. In contrast, correspondence with the CSO framework was more selective. Expert and capacity-builder functions were particularly prominent, whereas watchdog and citizenship-champion functions were weak, and no clear evidence was identified of the representative role as defined by WEF (2013).

Regarding the second research question, we find that no single theoretical perspective fully explains HUBA's role configuration. The industrial network management perspective captures HUBA's coordination of relationships, resources and interaction across the battery ecosystem, while meta-organization theory explains its collective governance, service provision, boundary and category work and representation of member interests. Civil society organization scholarship provides a complementary but more selective perspective by identifying the extent to which HUBA's activities extend towards broader societal functions. The three perspectives therefore differ in their explanatory reach but, when applied together, provide a more comprehensive understanding of the multidimensional roles performed by industry associations in strategic industrial ecosystems.

Our findings also reveal important conceptual distinctions between apparently similar roles. Advocacy provides a particularly clear example. Although advocacy appears in both meta-organization and CSO scholarship, HUBA's regulatory engagement predominantly reflects meta-organizational advocacy because it focuses on representing the collective interests of members and the battery sector, while corresponding only partially to the broader societal orientation of CSO advocacy. Similarly, HUBA's service provision was directed primarily towards members and ecosystem participants, consistent with the meta-organization perspective, and therefore differs conceptually from CSO service provision oriented towards wider societal needs. These findings demonstrate the importance of considering the purpose, beneficiaries and relational context of organizational activities rather than inferring organizational roles from activity labels alone.

The study consequently contributes to understanding industry associations in two related ways. First, it demonstrates empirically that the same organizational activity may simultaneously correspond to different theoretically defined roles. Activities such as policy consultations, conferences and knowledge platforms can simultaneously contribute to ecosystem coordination, collective member organization and selected societal functions depending on their purpose, beneficiaries and relational

context. Industrial network management, meta-organization theory and CSO scholarship should therefore be regarded as complementary rather than competing analytical perspectives. Second, the findings show that formal organizational status alone provides an incomplete basis for understanding industry associations. Although HUBA is legally registered as a civil association in Hungary, its observed activities correspond strongly to network-management and meta-organizational roles and more selectively to traditional CSO roles. A functional perspective therefore provides a more comprehensive understanding of industry associations than reliance on legal status or organizational labels alone.

The findings also suggest opportunities for extending research on meta-organizations. Recent scholarship proposes that differences among meta-organizations may be associated with how they acquire and deploy resources (Bor & Cropper, 2023). The present findings suggest that such differences may also be reflected in their role configurations. Future research could therefore examine whether and how resource availability and mobilization shape the relative emphasis placed on governance and co-management, advocacy, boundary and category work and service provision across different types of industry associations.

Several limitations should nevertheless be acknowledged. First, the single-case design and focus on one national industrial ecosystem limit the transferability of the findings to other organizational and institutional contexts. Second, the documentary analysis relied primarily on HUBA's official communications and therefore reflects activities made visible by the Association itself. Although interviews and participant observation provided supplementary evidence for contextualization and triangulation, the study did not systematically examine how external stakeholders perceive HUBA's roles, effectiveness or legitimacy. Third, the analysis identifies the roles performed by HUBA but does not evaluate the outcomes or effectiveness of those roles. Accordingly, the frequency with which a role was identified should not be interpreted as evidence of its effectiveness or impact.

Future research could address these limitations by comparing industry associations across national, regional and European levels and incorporating the perspectives of member and non-member firms, policymakers, civil society actors and local communities. Comparative studies could also examine whether particular role configurations generate different organizational or ecosystem outcomes.

Recent developments indicate that public controversy surrounding Hungary's battery industry has intensified, particularly concerning environmental impacts, foreign investment, regulatory oversight and community acceptance (Kronstein, 2026; Wu, 2024). These developments illustrate the dynamic institutional environment within which HUBA operates and suggest that longitudinal research could examine whether and how industry associations adapt their communication strategies and role configurations in response to changing societal expectations. In particular, future research could investigate whether growing societal scrutiny leads industry associations to assume more prominent citizen-facing, accountability or broader societal roles. As governments increasingly rely on intermediary organizations to coordinate industrial and sustainability transitions, understanding how these organizations balance member representation, ecosystem governance and broader societal expectations is likely to become increasingly important for both research and practice.

This study demonstrates that industry associations in strategic industrial ecosystems cannot be adequately understood through a single organizational lens. Their activities simultaneously involve coordinating ecosystem relationships, organizing collective member action and, to varying degrees, performing broader societal functions. Recognizing these multiple dimensions provides a more precise basis for understanding how industry associations contribute to the governance and development of emerging strategic industrial ecosystems.

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