

ADDRESSING GRAND CHALLENGES THROUGH DIFFERENT FORMS OF ORGANIZING: A LITERATURE REVIEW

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ABSTRACT

We conduct a literature review on forms of organizing that address grand challenges, which are operationalized as the Sustainable Development Goals of the United Nations, as this framework is universal and widely adopted. By analyzing the articles that match our criteria, we identify six differentiable organizational forms: movements, temporary organizations, partnerships, established organizations, multi-stakeholder networks, and supranational organizations. These six forms are differentiated based on the two following categories: organizing segment and communicational technological approach. Our analysis shows that tackling a grand challenge often starts with collectives as a protest culture without any expected goal, besides sending an impulse to others. This impulse is received by criticized institutionalized organizations that have the capacity and resources to address the problem properly. However, new challenges arise as these organizations inadequately resolve these problems, thereby leading to conflict-laden areas of tension, wherein emergent organizations complement institutionalized organizations that have created the first infrastructure. To solve the most complex problems, a trichotomous

Organizing for Societal Grand Challenges

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relationship between different forms of organizations is necessary. Moreover, communicational technological approaches become more sophisticated as grand challenges increase in complexity.

Keywords: Grand challenges; forms of organizing; organizing segments; communicational support; technological support; process model; movements; temporary organizations; partnerships; established organizations; multi-stakeholder networks; supranational organizations

INTRODUCTION

Grand challenges are formulations of complex, large-scale, and global problems, which are sought to be solved through collaborative and social efforts (George, Howard-Grenville, Joshi, & Tihanyi, 2016). The essence of encouraging dialogues and innovative solutions has thus driven multilateral agencies, foundations, and governments to solve such grand problems collectively (George et al., 2016). Recent research covers several grand challenges, such as climate change, exploitative labor, famine, and poverty, “perhaps the most universal and widely adopted grand challenges are the Sustainable Development Goals (SDGs) of the United Nations (UN)” (George et al., 2016, p. 1881). In 2015, all 195 member countries of the UN agreed upon the 17 goals to “end poverty, protect the planet, and ensure prosperity for all as part of their new global ‘Agenda 2030’” (Howard-Grenville et al., 2017, p. 107).

From an organizational perspective, the interest in grand challenges is aimed toward forms of organizing to tackle grand challenges. Some researchers even argue that existing organizational forms are unsuitable (Ferraro, Etzion, & Gehman, 2015). However, the call for institutional and organizational change toward novel forms and mechanisms (Luo, Zhang, & Marquis, 2016) has been confronted by other scholars based on existing organizational forms of addressing vast social problems (Puranam, Alexy, & Reitzig, 2014).

This paper aims to reveal different forms of organizing to address grand challenges by analyzing and outlining previous studies. We conclude that six organizational forms – movements, temporary organizations, partnerships, established organizations, multi-stakeholder networks, and supranational organizations – can be differentiated based on two categories. First, three different segments are differentiable: designed organizations, emergent organizations, and collectives (Puranam et al., 2014); second, these forms depend on communicational technological approaches.

METHODS

We conducted a literature review to analyze different forms of organizing addressing grand challenges that have been previously studied. To operationalize grand challenges, we decided to follow the definition by George et al. (2016), who stated that the SDGs are “the most universal and widely adopted grand challenges”

(p. 1881). To ensure thoroughness and rigor, this review began with planning the architecture (Tranfield, Denyer, & Smart, 2003). Basic building blocks were established, stating inclusion and exclusion criteria (Denyer & Tranfield, 2009; Tranfield et al., 2003).

Using the EBSCOhost database (<http://www.ebscohost.com>) solely English language peer-reviewed articles were considered without restrictions based on July 2019 publications. According to the Boolean phrase, all SDGs were applied to titles, abstracts, and full texts, thereby resulting in an intentionally high number of 31,510 hits. To increase the consistency and robustness of the analysis, editorial volumes (Colquitt & George, 2011; George, 2016) and special issues (Howard-Grenville et al., 2017) with similar foci were surveyed. This survey and discussions with experts in the field added 11 additional articles. Initially, most of the 31,510 studies contained foci that were irrelevant herein. To exclude irrelevant hits, such as philosophical and solely technological discourses, legislation, jurisdiction, and treaties, EBSCOhost operators were applied (AND “Sustainable Development Goals,” AND “social,” AND “organization”). This application yielded 412 relevant organization-related articles, meeting the inclusion criteria and manifesting none of the exclusion criteria. The abstracts of all the 412 organization-related articles were initially examined, followed by an in-depth appraisal of the remaining articles to exclude studies that neglected the interplay of grand challenges (SDGs) and organizational structures for a more comprehensive evaluation.

Using this procedure, 40 journal articles matched the defined criteria, combined with the 11 added by experts, thus constituting the core of this review. Therein, the common foci and significant differences were scrutinized via an in-depth analysis (Tranfield et al., 2003).

RESULTS

Upon evaluation, we realize that six organizational forms are differentiable: movements, temporary organizations, partnerships, established organizations, multi-stakeholder networks, and supranational organizations. Moreover, we notice that these forms vary according to organizing segments (Puranam et al., 2014) and communicational technological support. As both categories are extremely important toward differentiating the six organizational forms, we briefly introduce them before outlining the various forms.

Organizational Segments

The following three segments are distinguishable: designed organizations (e.g., established corporations); emergent organizations [e.g., emergent non-governmental organizations (NGOs)]; and collectives (e.g., social movements). Designed organizations maintain the prerequisite to have a certain expectation of contribution toward a common goal. Emergent organizations seem to have some agents' contributions toward a common goal. Furthermore, collectives can neither be expected nor seem to contribute toward a common goal and hence are not

considered as an organization but remain a separate case of organizing (Puranam et al., 2014).

Designed organizations include a conglomeration of persons, some hierarchical level, division of labor, structural arrangements, common goals, and varying bureaucratic or procedural viewpoints, of which outcomes are expected (Katz & Gartner, 1988; Puranam et al., 2014). Conversely, emergent organizations have challenged this view to share a common technostructure and information infrastructure but do not have the prerequisite of pre-existing group memberships, tasks, roles, and expertise (Danner-Schröder & Müller-Seitz, 2020; Majchrzak, Jarvenpaa, & Hollingshead, 2007). However, they seem to contribute toward a certain goal (Puranam et al., 2014). While both segments are classified as organizations, collectives neither seem nor can be expected to contribute toward a common goal and hence are not categorized as organizations (Puranam et al., 2014). They are often defined as loosely organized with the sole purpose of provoking social change (Akemu, Whiteman, & Kennedy, 2016). Nonetheless, arguably, the promotion of new social ventures through media and professional associations by social movement organizations (SMOs) is an emergent organizational form and hence does not violate the condition of Puranam et al. (2014) (Akemu et al., 2016). In this case, SMOs are emergent organizations according to Puranam et al. (2014), and thus seem to contribute toward a certain goal, while social movements in their most basic forms are not organizations.

Communicational Technological Approach

The communicational approach is analyzed regarding not only the degree, closeness, and betweenness of centrality, which focuses solely on tie weights, but also the number and construction of ties, including formal and informal channels, pertaining to the interconnectedness and complexity (Opsahl, Agneessens, & Skvoretz, 2010). Hence, nodes can represent individuals in formal or informal contexts, organizations, or even countries with ties referring to formal/informal cooperation, friendship, and trade (Opsahl et al., 2010). The extent of communication approaches and organizational interaction among people increases due to complex interconnectedness, as does the emphasis on boundary or bridging organizations (BOs) and technological infrastructure (Herlin & Pedersen, 2013; Zarestky & Collins, 2017). Notably, BOs facilitate relationships between concerned parties, convene and build frameworks of trust, translate and enable comprehensible resources and information in all spheres, and mediate disputes and conflicts (Herlin & Pedersen, 2013). Technological infrastructure enables and supports organizational processes for information technology (IT) as “both an antecedent and a consequence of organizational action” (Orlikowski & Robey, 1991, p. 13). Technological support reflects digitalization, the technical specialization of functional structures, sophisticated tools, information systems (IS), dynamic market responsiveness, and the inclusion of new generation technologies (e.g., social media), thereby depicting a key component of organizational communication (Fernando, 2018; Miles & Snow, 1986). Technological support describes the use of devices for all functions. These include paying bills

(Warnecke & Houndonougbo, 2016), transforming energy resources (Thakur & Mangla, 2019), learning necessary entrepreneurial skills (Noske-Turner & Tacchi, 2016), or being updated owing to cloud computing or open data portals (Corbett & Mellouli, 2017; Wright & Nyberg, 2017).

ORGANIZATIONAL FORMS

Throughout the analysis, six organizational forms have emerged, and they are classified according to the defined categories that distinguish each form from another. Table 1 provides an overview.

MOVEMENTS

The first organizing form – movements – represents the least institutionalized and cross-sectoral form. This form not only solely consists of voluntary members but also has its administrative control entailed in external entities, such as government agencies, which can restrict the pursuit of such forms (King, 2004).

Empirical Studies

King (2004) analyzes sustainable city development in Albuquerque, USA, emphasizing the leadership role of neighborhood associations, which are a type of grassroots associations/movements in urban decision-making, bridging community members, and providing citizen input. Kumar and Chamola (2019) depict a developed social movement that has evolved into a fair trade organization (FTO), establishing new governance mechanisms in many food industries (e.g., the case of Dehradun, India) and examining production and consumption behavior. While the neighborhood associations remain a social movement, the grassroots fair trade movements do not (Kumar & Chamola, 2019).

Organizational Segment

Movements are seen as local actors' intelligent efforts to achieve local legitimacy via periodically challenging moral and material impacts, involving periods of pain, protests, and discursive translations (Lawrence, 2017). Both early movements without any degree of corporatization and institutionalization can be seen as collectives (Puranam et al., 2014). The outcome of these forms cannot be anticipated and may even be disruptive, hence framing these early forms as "alternative culture" (Kumar & Chamola, 2019, p. 79). However, the fair trade movement has developed into an FTO, stating expected outcomes, and transformed into a designed organization (Puranam et al., 2014).

Communicational Technological Approach

As the least institutionalized form with a one-way interaction stream, this form has the least sophisticated communication technological approach, stating

Table 1. Overview of Organizational Forms.

Organizational Forms	Movements	Temporary Organizations	Partnerships	Established Organizations	Multi-stakeholder Networks	Supranational Organizations
Characteristics	<ul style="list-style-type: none"> • Solely voluntary members • Administrative control is external • Meetings and protests as main mean of coordination 	<ul style="list-style-type: none"> • No permanent structure intended • Focus on few or one SDG • Promotion of one agenda 	<ul style="list-style-type: none"> • Lasting contributions toward SDG achievement • Focus on one SDG • Agreement of common purpose, specific task and shared risks & resources • Public value governance instead of traditional administration 	<ul style="list-style-type: none"> • Institutionalized contribution to address one or many SDGs • Reconsidered and developed strategies of existing structures • Changing education and attitudes • Quantify progress via eco-labels and certifications 	<ul style="list-style-type: none"> • Democratic and ecological decision-making apparatus as core principle • Respond to failed initiatives of designed organizations • Social processes as mean of coordination • Instead of traditional command and control 	<ul style="list-style-type: none"> • Meta-governed inclusion of all stakeholders: collectives, designed and emergent organizations • Ambivalent: supporting flexibility & stability, agglomeration & individual variation, hierarchy & heterarchy • Collaborative platforms • Open innovation platforms • Collaborative ecosystems • 4 Industrial Revolution organizations • Interscalar networks
Empirical examples	<ul style="list-style-type: none"> • Neighborhood associations • Grassroots movements 	<ul style="list-style-type: none"> • Projects • Consortiums • Programs • Initiatives 	<ul style="list-style-type: none"> • Public-private partnerships (PPP) • Information communication technology for development partnerships (ICT4D) • Multi-stakeholder partnerships (MPS) • Cross-sectoral partnerships (CPS) • Community partnerships 	<ul style="list-style-type: none"> • Project poverty alleviator (PPA) • Micro finance institutions (MFIs) • Social enterprises 	<ul style="list-style-type: none"> • Networks of Labour Activism (NOLA) • Self-helping groups of micro-entrepreneurs • Social network facilitators • Green economies/energy networks • Ecological citizenships • Communicative ecologies • Resilient networks 	

Organizational segments	Collectives	Designed (for one purpose by the UN)	Designed	Designed	Emergent & designed	Emergent (continuously evolving through interactions making outcomes hard to expect or predict)
Communicational technological approach	<ul style="list-style-type: none"> • Only one-way interaction stream of BOs • Indifferent toward ICT 	<ul style="list-style-type: none"> • Temporary stream of communication designed by the UN • Platforms as bridging tool to bring partners together, no particular organization • Consumer of ICT 	<ul style="list-style-type: none"> • Increased long-lasting interactivity to achieve sustainable objectives among equally important partners • Introduction of BOs to function as incubator and decision-influencer, building trust, translate and enable comprehensive information • Reciprocal interaction with ICT 	<ul style="list-style-type: none"> • Higher rate of interaction among state-like public administration and social entities • Established organizations function as promoter towards balance between global economy, green markets and national political systems • Reformation of ICT 	<ul style="list-style-type: none"> • Higher rate of interaction throughout institutions, sectors, states, industries and communities via long-lasting institutionalized nodes and ties • Fluid role assessment of BOs: decision-making and responsibilities are completely open and diffusive • Developer of ICT 	<ul style="list-style-type: none"> • Most intertwined and complex interactions • BOs are crucial and become backbone organizations to foster communication; can function with or without lead organizations • Melting pot of ICT and human interaction with digital structures as central nervous system

indifference toward ICT, with sole personal meetings – mostly provoking change via critique – and no particular need for mediators and moderators among the stakeholders. This depicts the lowest degree of interconnectedness and complexity, following a usual phase of energizing via protests, exploring via disruptive translations, and ultimately integrating embedded practices (King, 2004; Lawrence, 2017; Opsahl et al., 2010).

TEMPORARY ORGANIZATIONS

The second form – temporary organizations – is characterized by an organizational structure that is not conceptualized to be permanent and is “[...] able to handle only a few problems, or in the extreme case, only one” (Lundin & Söderholm, 1995, p. 447). This form is not only characterized by the mere focus of one SDG but also is an umbrella term for projects (Fernando, 2018), consortiums (Watson, 2016), declarations or programs (Wysokińska, 2017), and especially initiatives (Anders, 2018; Calderón, 2018; Weidenkaff, 2018) to promote certain agendas (Jones, Comfort, & Hillier, 2016).

Empirical Studies

Anders’ analysis (2018) of the organization Global Reporting Initiative (GRI) fosters transparency concerning environmental aspects, with European organizations being provided with concepts and standards to disclose sustainability-related data. Calderón (2018) places the responsibility of climate action toward the global economy, urging global players to invest in new technologies for sustainable infrastructure, such as new mobility services in a multi-partner global initiative. The UN policy initiative, “Business Leaders Initiative on Human Rights” (Arnold, 2010, p. 371), incorporates human rights policies that have been reported to exist as soft law guidelines before they become hard law, committing transnational corporations to human rights protection. Jones et al. (2016) analyze the “Common Ground” initiative consisting of institutional stakeholders, such as the UN General Secretary and six of the world’s leading marketing companies, to promote health, education, and human rights. This designed initiative advertises environmental strategies to protect and create social value (Jones et al., 2016). Similarly, the initiative “Decent Jobs for Youth” (Weidenkaff, 2018, p. 26) in 2016 functions as a platform to integrate various partners – governments, youth, and civil society – to provide partner organizations with expertise and offer youth networking possibilities (Weidenkaff, 2018).

Furthermore, in targeting youth unemployment, Fernando (2018) examines the UN Program “Youth Empowerment Project [...] the first-ever multi-stakeholder alliance on action for youth” (Fernando, 2018, pp. 14–15), a global initiative to support young digital natives with skills via technical and vocational training. Wysokińska (2017) analyzes SDG implementation in a constitutional framework, a Polish program involving all key stakeholders to implement the Post-2015 SDG agenda into Polish legislature – a well-designed cooperation with allocated roles to address various SDGs (Wysokińska, 2017). The development intervention “corporate community development” (McEwan, Mawdsley, Banks, &

Scheyvens, 2017, p. 28) in South Africa is another institutionally designed interventive form, which has transformed from a simple subordinate to the private sector to a stakeholder among other actors (McEwan et al., 2017).

Similarly, in the 1990s, the US Congress established the empowerment zone and enterprise community initiative (EZ/EC), partnering with religious organizations, private industries, and community development organizations (CDCs) to revitalize distressed neighborhoods in urban US communities (Oakley & Tsao, 2007). The EZ/EC initiatives failed to meet the expectations of increasing professional and technical occupations in the service sector and hence were replaced by US CDCs, which accumulated more capital, had a stronger impact on SDGs, and were slowly rooted in urban community involvement (Oakley & Tsao, 2007). Similarly, the Nepali state disaster risk management has formed a consortium to bring humanitarian and development partners together to build resilience to external risks and hazard exposure with new modes of coordination mechanisms, such as emergency operation centers or early-warning systems (Watson, 2016).

Organizational Segment

All temporary organizations have been clearly designed and mostly part of the UN or state program to address the SDGs. However, some of them are rooted in societal structures – administrations, public governance, or foundations – and can institutionalize (McEwan et al., 2017; Watson, 2016, Wysokińska, 2017). Others remain to be examined to determine whether they have fulfilled the temporary function (Fernando, 2018; Weidenkaff, 2018) or even failed to fulfill expectations (Oakley & Tsao, 2007). Nevertheless, these outcomes are expectable and can thus be addressed as designed organizations.

Communicational Technological Approach

This organizing form depicts a temporary radial stream of communication between those that the UN is responsible for and the consortiums, initiatives, etc. (Anders, 2018; Calderòn, 2018; Watson, 2016; Weidenkaff, 2018). The platform, provided by the UN, bridges partners and facilitates working relationships without BOs, but with the use of IT (Fernando, 2018; Herlin & Pedersen, 2013).

Technological support is immanent for temporary organizations to address SDGs as they use digital transformational change by developing digital skills and green jobs (Fernando, 2018). This mere *consumption of ICT* can be considered as both the strength and weakness of such organizing forms because initiatives are based upon already existing platforms and ICT infrastructures (Jones et al., 2016), mobility services (Calderòn, 2018), open internet access (Anders, 2018), simulations, and new generation technologies (Watson, 2016).

PARTNERSHIPS

Partnerships, as the third form, correspond with the 17th SDG “Partnerships for the Goals” (George et al., 2016). This organizing form aims at lasting contributions toward SDG achievement through revitalizations, thus embedding the

collaborative action of various parties with a common purpose, specific tasks, shared risks, responsibilities, and resources (George et al., 2016; Ismail, Heeks, Nicholson, & Aman, 2018).

Empirical Studies

Pinz, Roudyani, and Thaler (2018) examine public–private partnerships (PPPs) in South Korean restructuring ports, Sri Lanka’s textile industry, and infrastructure projects in Spain. Thus, they state PPPs as an appropriate instrument to achieve sustainable objectives by shifting the paradigm in public management from traditional administration to new public value governance. This designed PPP heavily relies on another organization – the GRI – to provide sustainability-balanced scorecards for improved public service delivery (Pinz et al., 2018). The heavily technocratic form of information and communication technology for development (ICT4D) has been studied by Ismail et al. (2018), mostly focusing on the progress of digital harmony. This technology-focused partnership combines material elements – organizations, technologies, and processes – and symbolic elements – values, ideas, and discourses. Based on a Malaysian PPP, the ICT4D is considered an evolution of partnerships to address SDGs, which NGOs and governments have failed to solve in the past. One partnership in western Uganda underlying the concept of corporate social responsibility (CSR), which has evolved from “purely philanthropic actions and focus on second generation CSR” (Adiyia & Vanneste, 2018, p. 220), depicts community partnerships as linkage creators between the accommodation sector and poor neighborhood communities.

Organizational Segment

This designed organizational form can be considered an organizational instrument to achieve sustainable objectives – PPPs (Pinz et al., 2018) – or an organizational form in itself, such as ICT4D. Both perspectives, from instrumental or institutional perspectives, can be categorized as designed, contributing toward an articulated and communicated goal, thus increasing public value (Ismail et al., 2018; Pinz et al., 2018).

Communicational Technological Approach

The increased interaction can be observed through the multinational partnerships analyzed by Herlin and Pedersen (2013), examining the importance of BOs in a Danish corporate multinational foundation. Herlin and Pedersen (2013) state the role of foundations as incubators, while NGOs act as decision influencers. BOs are designed organizations that facilitate relationships between other organizations – the founding companies or established NGOs and emergent partners – resulting in a tri-part relationship of BO–foundation–NGO (Herlin & Pedersen, 2013). Aiming at a lasting partnership for the goals according to reports in India, ICT4D has previously failed due to its high complexity and conflict potential, thus emphasizing the importance of conflict management and BOs (Herlin & Pedersen, 2013; Ismail et al., 2018).

As the degree of interaction increases, the need for technological support and digital infrastructure becomes more important. Partnerships emphasize and use existing ICT infrastructure (Herlin & Pedersen, 2013; Pinz et al., 2018). However, in the process, ICT4D partnerships also provide IT, business processes, and digitally enabled services and develop a digital framework (Ismail et al., 2018). Hence, partnerships develop and advance the digital infrastructure in a *reciprocal manner*.

ESTABLISHED ORGANIZATIONS

The fourth form – established organizations – embodies a more institutionalized character developing existing strategies rather than building structures from scratch. Established organizations are characterized with a higher rate of interaction among levels of state-like public administration (Scherer, 2018), eco-innovation (Ma, Wang, Skibniewski, & Gajda, 2019), and social entities (Beck, 2017; Murisa & Chikweche, 2013; Warnecke & Houndonougbo, 2016).

Empirical Studies

Organizations, especially microfinance institutions (MFIs), have recalibrated the operational focus of shareholder value and economic growth with the emergence of SDGs (Murisa & Chikweche, 2013; Wright, Nyberg, & Grant, 2012). While MFIs have aimed at poverty reduction since the 1970s (Murisa & Chikweche, 2013), the efficiency and impact have been challenged by refocused agendas, thus importing grand challenges concerns into daily business (Wright & Nyberg, 2017). Beck (2017) elaborates on development strategies for microfinance NGOs in Guatemala with feminized policies to ensure gender equality, quality education, and the end of poverty. These policies can either solely focus on monetary aid or a rather holistic approach, providing women with cultural, financial, and environmental education, similar to the tools applied in rural Bangladesh communities (Mair, Marti, & Ventresca, 2012). Women are empowered through basic math and accounting training and lessons about citizens and property rights (Mair et al., 2012).

Similarly, Murisa and Chikweche (2013) analyze micro-entrepreneurs in Zimbabwe, with a new role being introduced – the project poverty alleviator (PPA) – imitative entrepreneurship driven by sustainable services in rural areas where traditional banks find markets extremely unattractive or risky. Furthermore, PPAs, as the holistic MFIs examined by Beck (2017), strongly emphasize education and attitude transformation to address poverty reduction, (gender) equality, and financial sustainability (Murisa & Chikweche, 2013). Social enterprise accelerators, a social enterprise with a pay-as-you-go business model, combat the low electrification rate in Sub-Saharan Africa (Warnecke & Houndonougbo, 2016). The products of such enterprises range from sophisticated grid projects, with extremely high initial costs, to home system kits that can be installed off-grid or even a pico-solar system, the easiest installation even for non-specialists. Social enterprises may not solve all developmental problems but function as

an accelerator for the public sector and institutional investments, providing an initial boost to the development of a functioning infrastructure (Warnecke & Houndonougbo, 2016).

Organizational Segment

Altered strategies, such as sustainability specialists, developed guidelines, and frameworks of existing organizations, imply a refocused contribution toward a certain sustainable goal (Wright et al., 2012). Business plans and strategies define thresholds to combat poverty (Murisa & Chikweche, 2013) or gender inequality (Beck, 2017), thus formulating an outcome to be expected and stating a designed organization (Puranam et al., 2014; Wright & Nyberg, 2017).

Communicational Technological Approach

According to Scherer (2018), the production and purchasing of public goods and environmental components of products should be internalized as fixed costs when doing business, thus being translated into organizational practice, underlying the concept of CSR (Scherer, 2018; Testa, Russo, Cornwell, McDonald, & Reich, 2018; Wright & Nyberg, 2017). Shifting the business value toward sustainable business innovation (Raith & Siebold, 2018) or eco-innovation, new frameworks guide this shifted designed organization via eco-labels, environmental certifications, and sustainable consumption and production strategies (Ma et al., 2019). Organizations with shifted or altered frameworks are sought to promote balance and communications between the global economy, green markets, and national political systems via soft policies and persuasion (Testa et al., 2018). This structure is integrated into the established firm for environmental risk reduction and value creation, incorporating SDG concerns in internal communications (Bansal, Kim, & Wood, 2018; Ma et al., 2019; Raith & Siebold, 2018). Each established organization functions as a promoter and hence a boundary element to balance global economies, green markets, and national political systems.

Established organizations addressing SDGs use and consume existing technological infrastructures, which mostly focus on mobile-based technologies to surmount infrastructural inefficiencies (Murisa & Chikweche, 2013; Warnecke & Houndonougbo, 2016). Consequently, mobile phone devices are used not only for communication purposes but also for electricity payments (Warnecke & Houndonougbo, 2016). Therefore, technological usage also drives a complete *technological reformation* and shift toward clean energy.

MULTI-STAKEHOLDER NETWORK

Responding to failed initiatives of designed organizations, multi-stakeholder networks – the fifth form – seek to address more complex SDGs with a democratic approach. Multi-stakeholder networks rely on developed or established systems (ASCI., 2018), surmounting institutions (Piper, Rosewarne, & Withers, 2017), sectors (Acelandu, Șerban, Tîrcă, & Badea, 2018), states (Noske-Turner &

Tacchi, 2016), industries, and communities (Venkatesh, Shaw, Sykes, Wamba, & Macharia, 2017) or communitarian ties (Islar & Busch, 2016). Networks are characterized “as a set of goal-oriented independent actors that come together to produce a collective outcome that no one actor could produce on their own” (Echebarria, Barrutia, Aguado, Apaolaza, & Hartmann, 2014, p. 29). Although the range of addressing SDGs varies considerably, all variations of multi-stakeholder networks have a democratic and ecological decision-making and participation apparatus as the core principle (Arnold, 2010; Islar & Busch, 2016; Ricciardelli, Manfredi, & Antonicelli, 2018).

Empirical Studies

Piper et al. (2017) scrutinize migratory flows in inter- and intra-regional directions revealing causes of forced labor, trafficking, child labor, and informal employment in Asia and Global South colonies. Networks of labor activism (NOLA) have been formed to integrate human and labor rights into societal frameworks (Piper et al., 2017). This emergent organizational form responds to fragmented institutional structures of migrant policies and failed initiatives, hence former temporary organizations (Anders, 2018; Weidenkaff, 2018) to fulfill the standards of decent work, maneuvering between migrant organizations and labor unions (Piper et al., 2017).

ASCI. (2018) and Mair, Wolf, and Seelos (2016) analyze a formed network of women micro-entrepreneurs and self-helping groups in rural households in Madhya Pradesh and rural villages in India to combat gender inequality and poverty with a business development strategy called the “gender energy” (ASCI., 2018, p. 65), overcoming the critique of solely focusing on a single dimension of inequality. The social network facilitators with ICT interventions, as studied by Venkatesh et al. (2017), depict network enablers, mostly ICT kiosks in rural India, to support women’s entrepreneurship and facilitate information access to combat discrimination against women. ICT kiosks, or social network facilitators, are centrally located and train women in entrepreneurial activities to ensure gender equality and create synergies with other grand challenges, such as poverty eradication. These networks surmount traditional cultural community ties and jointly use ICT to uncover institutional voids, which exclude women from market participation (Mair et al., 2012; Venkatesh et al., 2017).

When properly established, institutions are implemented, women have equal access to organizational resources, and typical functioning markets may emerge. However, if such institutions are missing, compensatory structures are needed, as depicted in the form of multi-stakeholder networks, including emergent response groups (Mair et al., 2012; Williams & Shepherd, 2016). Aceleanu et al. (2018) describe a far-reaching green economy, a local community in rural Romania, depicting an energy network involving schools, universities, NGOs, and governmental actors to reduce greenhouse gas emissions and energy dependency. This established network is directly generated by the Romanian renewable energy sector as a prompt answer to the untouched potential of Romanian developmental possibilities (Aceleanu et al., 2018). Another green economy is analyzed by

Thakur and Mangla (2019), who focus on recycling and reusing electrical waste. This circular economy in India is based on sustainable operations management, identifying key drivers along the supply chain to process eco-friendly green products among leading established Indian firms in the home appliance sector (Thakur & Mangla, 2019). The decision-making and responsibilities of ecological citizenship are completely open and diffusive. They broaden the former definition of citizenship to the new understanding, depicting social processes through which individuals and groups engage in their rights, surmounting mere legal engagements (Islar & Busch, 2016).

Considering the study of the eco-driven communities in Germany and Denmark, traditional command and control have been substituted with a certain degree of peer pressure to follow the sustainable agenda while maintaining an open dialogue that accelerates change (Islar & Busch, 2016). Communicative ecology, an intertwined designed organization of communication and informational flows, studied by Noske-Turner and Tacchi (2016), is crucial for unique projects in the Pacific Islands. Small grants for media and development projects are offered to provide new frameworks, mobilize media for sustainable outcomes, and integrate diverse networks within the Pacific context. This collaborative approach toward sustainability can also be observed in the highly democratic and self-organized networks of emergency management organizations in Macerata, Italy, as studied by Ricciardelli et al. (2018). Such resilient networks are designed to withstand external shocks via dynamic processes and community-based actions with means of self-organizing, flexibility, inclusiveness, and integration. SDGs are considered the major global instrument for reducing disaster risks, thus transforming the dynamics of traditional emergency management from simply shielding to accept and manage risk via resilience building (Ricciardelli et al., 2018).

Organizational Segment

Multi-stakeholder networks react to a failed or inadequately successful attempt to solve an SDG via established organizations or partnerships. More complex SDGs demand flexible, fluid, and democratic solutions among various stakeholders. Initially, the outcome is derived from predefined failed outcomes of established organizations and partnerships and thus could be classified as designed. However, such fluid solutions make it difficult to expect a certain result but seem to contribute to an outcome. Therefore, multi-stakeholder networks can be regarded as designed organizations because the outcomes are derived from previous failed outcomes but emerge throughout the lifespan and various processes to an emergent organization (Puranam et al., 2014).

Communicational Technological Approach

Multi-stakeholder networks seek social connectedness, dialogue, and collaborations within geographical boundaries but may also try to find consensus among divided conflict-laden spaces within political boundaries (Islar & Busch, 2016). Surmounting such boundaries, multi-stakeholder networks depict a fluid role

assessment of BOs whereby parties moderate within cross-sectoral cooperations and institutions. Owing to the increased degree of interaction, communicative ecologies, a manifestation of multi-stakeholder networks, transcend communication and information flows in a democratic decision-making apparatus (Noske-Turner & Tacchi, 2016; Ricciardelli et al., 2018).

By improving technological support, multi-stakeholder networks are characterized by not only using technology and providing computable data but also *optimizing and developing*. Available power supplies for gender equality are optimized via technical assistance software and training (ASCI., 2018). Interactive and intelligent systems support coordination mechanisms in resilient networks (Ricciardelli et al., 2018). Furthermore, clean technologies and technological innovations to process electronic waste become an irreplaceable part of the human–operational–technological components (Thakur & Mangla, 2019). Additionally, grid infrastructures for renewable energy technologies are becoming more efficient in transforming fuel-based energy supply up to 100% renewable energy (Islar & Busch, 2016). Mobilized media – the agglomeration of all social media – integrate digital technologies, using and developing both newer and older technologies. These are connected through communication modes and require high costs of learning the necessary media skills (Noske-Turner & Tacchi, 2016). Not only do digital technologies enable entrepreneurs to receive information and communicate with clients, but they also form a central location of social network facilitators (Venkatesh et al., 2017).

SUPRANATIONAL ORGANIZATION

The sixth organizational form – supranational organization (Ansari, Wijen, & Gray, 2013; Corbett & Mellouli, 2017) or interscalar network (Echebarria et al., 2014) – depicts the most digital and global approach to tackle SDGs. A supranational organization relies almost solely on sophisticated IS platforms to perform the most intertwined and complex interactions within new inter-organizational architectures, fields, and coordination mechanisms (Bogers, Chesbrough, & Moedas, 2018; Grodal & O'Mahony, 2017; Picciotti, 2017; Pollitzer, 2018). This form exhibits ambivalent support for both flexibility and stability and the inclusion of all stakeholders operating in one common central nervous system – the most sophisticated ICT infrastructure (Ansell & Gash, 2017; Picciotti, 2017).

Empirical Studies

Ansell and Gash (2017) distinguish between various platforms as collaboration modes. These platforms, which can be highly adaptive and flexible, support both stability and flexibility, with the ambivalent characteristic serving as an umbrella term to agglomerate individual action into one stream, while promoting variation as open innovation platforms depict (Ansell & Gash, 2017; Bogers et al., 2018). Open innovation platforms accumulate internal and external ideas from small- and medium-sized enterprises, multinational teams, and not-for-profit

organizations. Thus, they establish an internet infrastructure upon which social networking sites are developed, adopted, and transferred into the realm of regulated sectors such as health, energy, and transport, with the SDGs being the primary impetus (Bogers et al., 2018; Williams & Shepherd, 2016).

When engaging with public policy decision-making, collaboration platforms may evolve into collaborative governance and further into whole collaborative ecosystems (Ansell & Gash, 2017). Referring to wide-range and meta-governed platforms integrated into sophisticated information ecosystems, Corbett and Mellouli (2017) identify such cross-sectoral platforms as supranational organizations with collectives or communities, emergent organizations (e.g., formed NGOs), and public management to strive for smart water management and public green spaces. The organizational form in Q-City, a large urban area in the province of Quebec, Canada, operates from a common central nervous system – the IS infrastructure (Corbett & Mellouli, 2017). The supranational organization not only optimizes the use of scarce resources such as water but also links the three interrelated spheres – administrative, political, and sustainable – with various segments of organizing – collectives, emergent, and designed organizations (Corbett & Mellouli, 2017).

Another inter-organizational and inter-sectoral collaborative network is analyzed by Picciotti (2017) to elicit coordination mechanisms beyond community boundaries. The network of social enterprises reveals a new inter-organizational architecture with different institutions, public administrations, and enterprises to liberate land from mafia structures via the Associazione Libera Terra, an Italian social cooperative, to plead for cultural and social change (Picciotti, 2017). This “metamorphosis” (Picciotti, 2017, p. 248) of a network omits a lead organization but heavily relies on IS infrastructure as the central nervous system (Corbett & Mellouli, 2017). Such a development of networks with dynamic or no lead organizations represents the evolution of organizing caused by SDGs. It is difficult to cluster supranational organizations because hierarchy and heterarchy exist simultaneously with partial groups following a certain order and other groups operating dynamically and strictly democratically, solely bound together and orchestrated via the common nervous system.

Fourth Industrial Revolution organizations have been analyzed by Pollitzer (2018), who explores the progressive digitalization of the economy and society with ICT as its core but SDGs as the direction. Organizations aim to stop a digital divide ensuring e-sustainability to directly contribute to poverty reduction, quality education, gender equality and industry, innovation, and infrastructure through sophisticated mobile devices (Pollitzer, 2018). Through interscalar networks vis-à-vis SDGs, Echebarria et al. (2014) analyze various clusters – other innovation networks, agencies, universities, culture, policy, and technical institutes – and integrate pre-existing and emergent resources from interaction. The term scalar refers to the vertical, scalar hierarchy of relationships among this form (Lawrence & Dover, 2015). This interconnected form extracts knowledge from all the aforementioned clusters for learning regions (e.g., local councils or municipalities) functioning best in countries with high sustainability traditions such as Norway, Sweden, Italy, and Spain (Echebarria et al., 2014).

Organizational Segment

This network form involves various, perhaps all, considered stakeholders: collectives, such as groups of citizens (Corbett & Mellouli, 2017), showing no intention or expectation to contribute toward a greater goal; emergent organizations, such as those that emerged as non-profit partners (Picciotti, 2017), seemingly to contribute toward an SDG; and designed organizations, such as social enterprises (Picciotti, 2017), administrative organizations (Ansell & Gash, 2017), or city managements (Corbett & Mellouli, 2017). Thus, it solidifies the expectation of the outcome of the contribution (Puranam et al., 2014). In this open structure, beginnings of organizational lifecycles are difficult or even impossible to trace back. The involvement of all stakeholders across all organizing segments and the mere reliance on digital structures as the core of organizational existence – the “central nervous system” (Corbett & Mellouli, 2017, p. 441) – make it difficult to categorize the structures according to collectives and emergent or designed organizations. However, although supranational organizations comprise organizing forms of various segments, such organizing forms arguably seem to contribute toward the achievement of the most complex goals that continuously evolve, thereby forcing supranational structures to evolve similarly. This continuous evolution parallel to the dynamic changes of intertwined problems complicates the prediction or expectation of outcomes, although it seems to contribute toward an evolutionary fit between organization and problems, and thus, can be arguably classified as emergent.

Communicational Technological Approach

Supranational organizations are characterized by the most intertwined and complex interactions among stakeholders and sectors at all levels – social, economic, and environmental (Zarestky & Collins, 2017). This organizational form allocates projects and roles (e.g., lead organizations) but is solely meta-governed by intermediation rather than control (Ansell & Gash, 2017). Every variation of supranational organization emphasizes the importance of BOs. However, some BOs also function as critical lead organizations promoting variation, as open innovation platforms show (Ansell & Gash, 2017; Bogers et al., 2018). Such organizations must mobilize shared issues and goals to foster collaborations (Grodal & O’Mahony, 2017). Either with or without a lead organizational role, backbone organizations are crucial for the existence of supranational networks, providing strategic directions and fostering communication and dialogue in a highly dynamic and complex environment.

Technological support forms the core of supranational network activities and operations. The meta-governed collaborative platform relies on e-governance and hence distinctive software, crowdsourcing platforms, and web portals to transfer knowledge (Ansell & Gash, 2017). New major waves of technology – machine learning, quantum computing, and the Internet of Things – are constituted as future integral parts of regulated spheres in networks of energy supply and healthcare (Bogers et al., 2018). IS communities see IS or digital technology as the central nervous system with emergent technologies – simulation models, open

data portals, cloud computing, augmented reality, big data analytics, and Web 2.0 – which are essential. Mobile technologies provide highly granular information to enable seamless communication flow, which is an indispensable prerequisite for this supranational network to function (Corbett & Mellouli, 2017). Notwithstanding flawless communication flows, interscalar networks focus on learning regions to reach high sustainability standards (Echebarria et al., 2014). Supranational networks do not function without IS, not only because of automated processes, as in some established organizations, but also because emergent digital technologies are indistinguishably intertwined with this organizational form. It is impossible to separate IS from supranational networks because not only are all functions based on digital technologies but also involve the organizing form – all communication and coordination. Supranational networks can be seen as *melting pots*, merging inextricably social and digital elements into a highly complex organizational form to tackle the most intertwined societal and environmental problems.

DISCUSSION

The organizational segments become more intertwined because communicational and technological support become more sophisticated as grand challenges increase in complexity, whereas organizational segments signify a certain process to tackle grand challenges.

Starting as a protest culture, first, rudimentary movements sense a societal or environmental problem that has not been (or inadequately) addressed by institutionalized structures such as the early fair trade movement (Kumar & Chamola, 2019). No contribution could have been expected to direct the problem except for aiming criticism – which is not necessarily constructive – at the lack of properly addressing the problem. This non-organizational form, although a form of organizing, is neither expected nor seems to contribute toward a goal (and can even worsen a problem). It is thus stated as collective, sending at least a diffuse impulse, thereby triggering the process of organizational awareness and change (Puranam et al., 2014; Wright & Nyberg, 2017).

This impulse is received by institutionalized organizations, which are criticized as unsuitable for tackling SDG concerns owing to their short-term objectives and narrow attentional structures (Bansal et al., 2018; Wright & Nyberg, 2017). However, they have the capacities and resources to duly address the problem, thereby altering infrastructures or even creating new ones to fulfill the need for change, such as UN programs or initiatives in the form of temporary organizations (Anders, 2018; Calderòn, 2018; Jones et al., 2016; Weidenkaff, 2018), partnerships (Pinz et al., 2018) or established organizations (Beck, 2017; Murisa & Chikweche, 2013; Warnecke & Houndonougbo, 2016). Contributions are expectable when the organizational focus is directed toward SDGs regarding the establishment or development of sustainable infrastructure and thus be referred to as designed organizations tackling grand challenges (Puranam et al., 2014). However, problems and conflicts arise as designed organizations inadequately solve problems or provide sustainable opportunities, thus leading to conflict-laden areas of tension.

Within these areas of tension caused by insufficiently addressing problems, emergent organizations fit in to complement designed organizations and fill gaps in institutional systems that have provided first infrastructures, such as digitally enabled services (Ismail et al., 2018) or even grid connections (Warnecke & Houndonougbo, 2016; Williams & Shepherd, 2016). Upon existing infrastructures, organizations that focus on the most complex problems seem to contribute toward a sustainable goal by providing highly specialized expertise in societal rights, such as NOLAs (Piper et al., 2017) or technological knowledge (Islar & Busch, 2016), and thus can be classified as emergent (Puranam et al., 2014). The more complex the problems (Wright & Nyberg, 2017), the higher the degree of necessary interaction and technological sophistication across industrial, national, and cultural borders. Furthermore, there will be more specialized knowledge of provided expertise fitting into the trichotomous relationship: a meta-governed supranational organization, of impulse sender–receiver–complement or simply put, collective – designed organization – emergent organization, as depicted in Fig. 1. Understanding this relationship contributes toward supporting political agencies, managers, and policymakers by promoting practical change agendas, alternative possibilities, and environmental awareness, thereby maneuvering organizational interventions where they are most effective and needed (Berkowitz & Grothe-Hammer, 2022; Grodal & O’Mahony, 2017; Wright et al., 2012; Wright & Nyberg, 2017).

FUTURE RESEARCH

Our findings open two research avenues that seem likely to be fruitful: organizational forms and organizing processes between organizational forms.

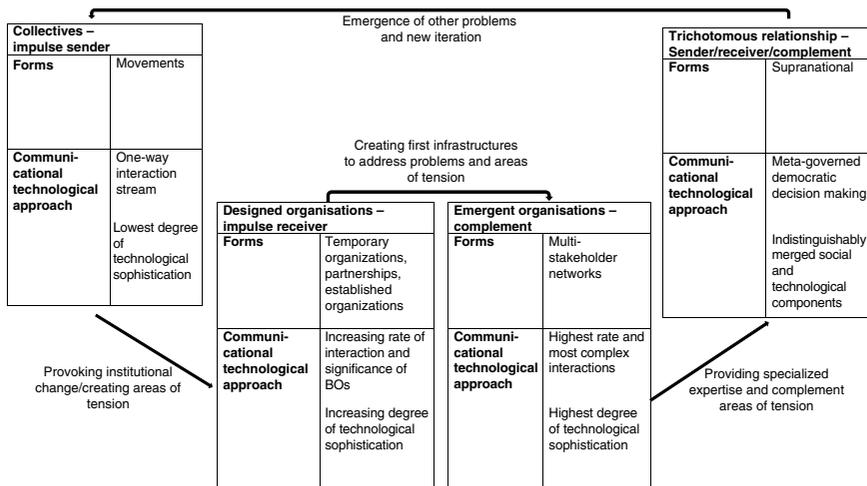


Fig. 1. Process Model of Addressing Grand Challenges Through Different Organizational Forms.

First, we call for more research on six different organizational forms. As our findings indicate, movements are essential in sending an impulse to induce grand challenge awareness. Noticeably, movements, and hence collectives, gain importance and media presence, such as civil groups fighting refugee crises or the pupils and students of “Fridays for Future.” Future research can elaborate on why and how an increasing number of movements emerge with more public presence than hitherto. While we have shown that movements make less use of technological sophistication (King, 2004), the movements fighting refugee crises and Fridays for Future indicate that technology is considerably important in organizing their ideas (Danner-Schröder & Müller-Seitz, 2020). Thus, future research can elaborate on how movements use technological resources to achieve their goals and which technologies are required. Moreover, as these rather loose connections of social interactions gain an increasing number of members in a rather short time span (e.g., Fridays for Future), it would be interesting to see how these groups develop a sense of purpose and a shared identity. Furthermore, it would be fascinating to understand how decision-making processes are established (e.g., in terms of a strategic direction) as movements usually omit traditional command and control mechanisms. Thus, which routines, scripts, templates, logics, and practices emerge? Or are they used in these groups to coordinate their purpose?

Although temporary organizations are designed for a limited amount of time (Lundin & Söderholm, 1995), it can be interesting to research processes before and after the lifespan of such organizations. Therefore, how are temporary organizations brought to life and what happens after the goal has been reached? Future research can elaborate if and how knowledge, practices, and resources can be used later by other organizations.

Supranational organizations reveal a final and trichotomous relationship within a socio-technological framework. However, little is known about how such complex forms sustainably emerge. Thus, research on how diverse organizations interact and how engagements between these organizations are ensured is essential. The core principle of supranational organizations is rather democratic. However, future research can explore these democratic processes and their sustainability or potential power struggles within these supranational organizations. Hence, we suggest focusing on coordination processes within supranational organizations.

Second, we suggest focusing on the organizational processes between the different organizational forms. Our findings indicate that collectives create areas of tension for designed organizations that consequently create the first infrastructure. Emergent organizations provide specialized expertise for trichotomous relationships. These findings suggest that one form triggers a response from other organizations. However, future research could further elaborate collaborative forms of organizing between different forms.

Therefore, studying how networks of actors from public, private, and third sectors and emerging collectives orchestrate collaboration outside and beyond formal organization (Kornberger, Meyer, Frey-Heger, Gatzweiler, & Martí, 2020) might be a promising future research area. Based on collectives, future research could analyze how movements emerge and are further transformed and

momentarily institutionalized. Thus, research could explore how institutional arrangements between different forms foster or hinder such a collective action.

Existing research acknowledges the need to link all dimensions of stakeholders (Gegenhuber, Schübler, Reischauer, & Thäter, 2022; Kroeger, Siebold, Günzel-Jensen, Philippe Saade, & Heikkilä, 2022; Stjerne, Wenzel, & Svejenova, 2022) via various tools, such as scaffolding (Mair et al., 2016), sustainable value chain linkages (Adiyia & Vanneste, 2018), and platforms (Fernando, 2018). However, future studies should further integrate the dimensions of time and goal orientation. While traditional organizations are criticized as being too short-term oriented, new sustainable agendas, usually over a long-term goal, need to be adopted within corporate frameworks (Wright & Nyberg, 2017). Owing to their long-term nature, established organizations discount grand challenges in favor of immediate problems, while short-term effects may be neglected by social movements, thereby solely increasing existing societal tensions (Wright & Nyberg, 2017). It remains to be researched how organizing forms solve grand challenges in an ambidextrous manner, thereby satisfying both seemingly contradictory goals – short-term benefit and long-term sustainability – while also uniting actors from different cultures and standards that can complicate common understanding (Grodal & O'Mahony, 2017; Lawrence, 2017). This specifically implies the extremely fluid role and stakeholder dynamics of the most complex forms of organizing (Grodal & O'Mahony, 2017; Berkowitz & Grothe-Hammer, 2022; Kroeger et al., 2022; Stjerne et al., 2022).

We have shown that technological support is deemed to be an integral part of grand challenge solutions. However, it also remains to be examined which risks and problems are caused by more sophisticated technology in socially interwoven networks, especially where technological and social components are indistinguishably intertwined relative to supranational organizations (Ansari et al., 2013; Wright & Nyberg, 2017). Future research could explore how organizing forms combine social media with offline sites. Moreover, the management of the extensive information between different organizations and the question of when organizations suffer from wrong or extensive information because of fake news could be interesting. The question of how organizations' networks interpret such information overloads, weighing their importance and relevance, needs further exploration. Thus, it might be relevant to analyze how networks manage the high initial costs of learning the necessary digital and media skills (Gatzweiler, Frey-Heger, & Ronzani, 2022).

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